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Documentation of the Averaging Lake Data by Regions (ALDAR) Program

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INLAND WATERS DIRECTORATE
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Abstract

The program ALDAR (Averaging Lake DAta by Regions) was developed to reduce to a manageable level the large amounts of data produced by a station- and cruise-oriented monitoring program. The program provides the user with a cruise summary for each parameter. Included in the output are interpolated parameter values, at each station, for any specified depth; area-weighted mean values, at specified depths, for designated regions (zones) and the entire lake; the actual parameter values influencing each region, and the depth and station at which each was recorded; volume-weighted values of the parameter by zone and for the entire lake, not only for each successive depth interval but also for the layer extending from the surface to each depth; and a summary report of the area-weighted mean surface (1 m) values for all the zones and the entire lake plus additional depth data for the whole lake and one other zone if requested. This program has been instrumental in comparing regions of the lake and studying time trends.

Résumé

Le programme ALDAR (Averaging Lake DAta by Regions/établissement de moyennes régionalisées, par zone, des paramètres lacustres) rend possible la réduction, à un niveau qui en permet la gestion, de la masse de données saisies dans des stations fixes et par des expéditions sur un lac. Il produit un état récapitulatif de chaque paramètre pour chaque expédition. Il comprend : les valeurs interpolées, à chaque station et à toute profondeur donnée; la moyenne pondérée selon la surface, à des profondeurs particulières de zones données et de l'ensemble du lac; les valeurs réelles, qui influent sur chaque zone, et la profondeur et la station où chacune a été enregistrée; les valeurs pondérées selon le volume, par zone et pour l'ensemble du lac, non seulement à chaque intervalle successif de profondeur, mais aussi pour la couche allant de la surface à chaque profondeur; et un état récapitulatif des moyennes en surface (1 m) pondérées selon la surface pour toutes les zones et pour l'ensemble du lac, plus, sur demande, des données supplémentaires en profondeur pour l'ensemble du lac et une autre zone. Ce programme a aidé à comparer les différentes zones lacustres et à étudier les tendances temporelles.

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INTRODUCTION

As surveillance activity on the Great Lakes expanded, the need arose for an efficient means of facilitating the interpretation of the vast amount of data produced by this multi-station, multi-cruise program. It was recognized that to follow trends in the variables being measured, some attempt had to be made to provide a single number or quantity representative of the lake as a whole. To achieve this objective the computer program ALDAR (Averaging Lake DAta by Regions) was created in July of 1975 by N. Knight, R. Gottinger and E.B. Bennett. This report is a detailed summary of what the program does and how it operates. It is intended to answer the questions most often asked by users of the program of the data summaries generated.

As the name suggests, ALDAR is based on a zonation or regionalization pattern defined by the user for the lake. Such a regionalization concept permits the user to manipulate data, not only on a whole lake basis but also with respect to specific regions in the lake in addition to the vertical segmentation. At the depths specified, ALDAR will produce a cruise summary for each parameter, providing the user with the following information:

(1) The observed parameter values influencing each zone, and the depth and station at which each was recorded

(2) For each station sampled, parameter concentrations interpolated with respect to (the specified) depths

(3) The area of the zones and the whole lake at the different standard depths

(4) Area-weighted mean values for each zone, and the whole lake, at each specified depth

(5) Volume-weighted mean values both from the surface to a specified depth (column) and between any two depths (layer) for each zone and the whole lake

(6) The quantity of the parameter, both column and layer values, for all zones and the whole lake.

PROGRAM ALDAR

Lake Regionalization

How does the program work? Each lake is divided into grid cells of 2 km, 4 km or 8 km in size, the average depth of each grid cell having been calculated from bathymetry profiles of the lake (Robertson and Jordan, 1978).[1] The grid cells are then assigned to zones, as determined by the user (Fig. 1). In this way a zoned bathymetry file is created which is then used by the program.

Calculations

The data from each cruise are entered into the STAR (STorage And Retrieval) data base by date and by station. The latitude and longitude positions are then converted to x and y coordinates in kilometres, according to the formula developed by Rodgers (1969), thus locating the stations on the grid map. At the standard depths specified

[1] Note: Land is assigned a depth of zero.

by the user (D_i), parameter concentrations (C_i) are calculated by means of simple linear interpolation. Where D is between D_0 and D_i, C can be calculated as,

$$C = C_0 + (D - D_0) \frac{\Delta C}{\Delta D}$$

with $\Delta C = C_i - C_0$ and $\Delta D = D_i - D_0$. For each parameter, the ALDAR program then associates a station with each of the grid cells based on proximity. This station-grid cell association will change relative to parameter sampling frequency, as shown in Figure 2. The observed/calculated parameter values for a station are assigned to all the grid cells associated with that station. The mean of the grid cells in each zone is taken to provide an area-weighted mean. Averaging the area vertically gives the volume-weighted mean.

Summary Report

After each parameter is run, a summary report is compiled, tabulating the 1-m area-weighted mean values for each of the zones and the whole lake (= zone 25). Furthermore, the user can specify up to five additional depths for zone 25 and one other zone to be included in the summary. The information contained in the summary report is added to the end of the permanent direct access file ALDREPS which must exist on the user's account. This file can be read by program ALDSUM to produce multi-cruise parameter summaries.

ZONED BATHYMETRY MAP

The user sets up the zoned bathymetry file (Fig. 1) to reflect the desired zone pattern using the program ZØNSEL. In defining the zones, each card represents a row, starting at the bottom of the lake. The cards are read as follows:

Column(s)	1-4	First zone number occurring in the row.
	5-8	Last cell number in the row belonging to that zone.
	9-12	Second zone number occurring in the row.
	13-16	Last cell number in the row belonging to that zone repeated for all zones in the row.
	77-80	Row number from gridded map.

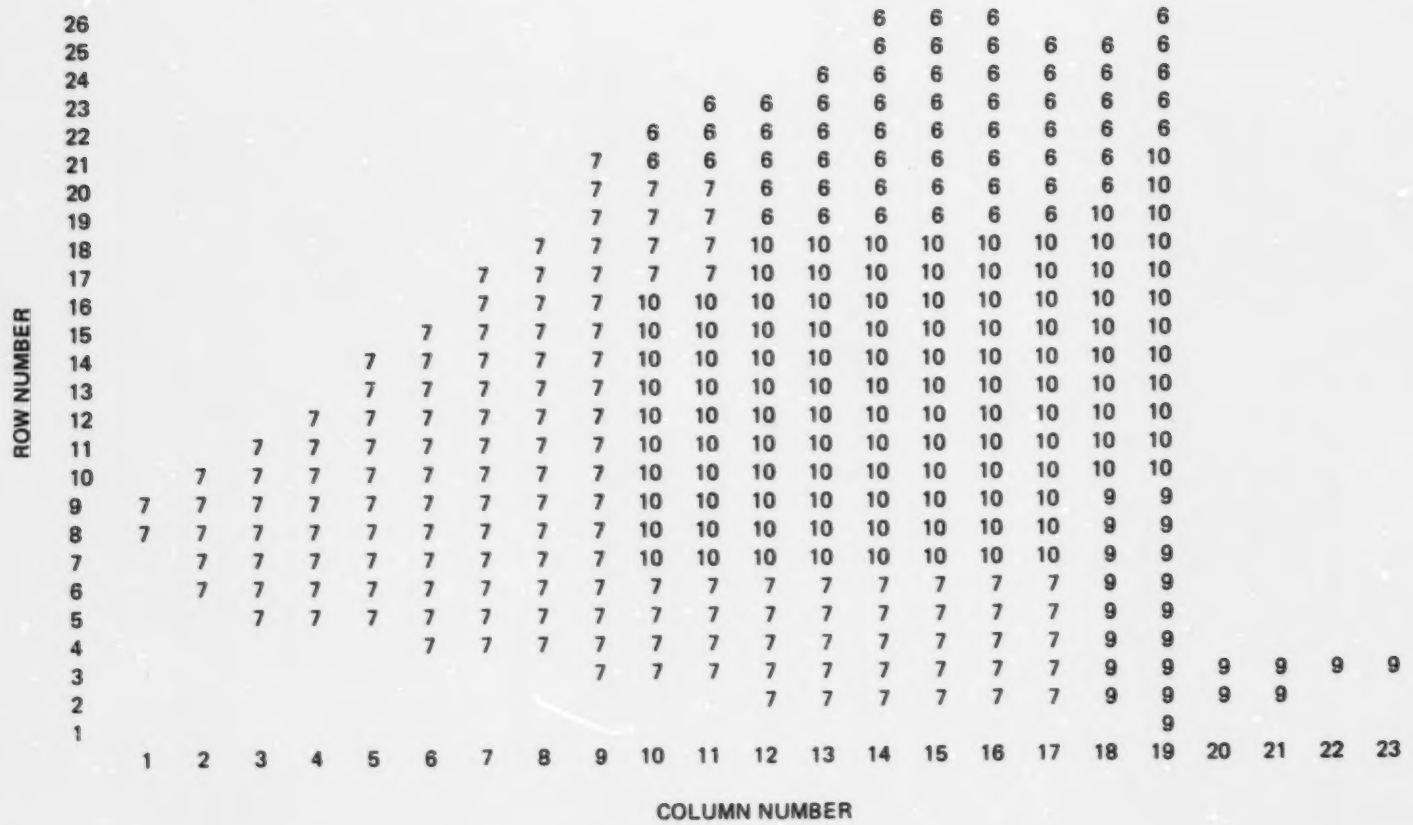


Figure 1. Zoned bathymetry map for the western end of Lake Ontario.

This is the station-grid cell assignment for parameter A, sampled at stations 16, 18, 20, 21, 22 and 86:

			18	18	18	20	20	21	21	21				
	16	18	18	18	18	20	20	21	21	21	21	21	22	22
16	16	18	18	18	18	86	86	21	21	21	21	21	22	22
16	16	16	18	18	86	86	86	86	21	21	21	21	22	
16	16	16	17	17	17	86	86	86	86					

The station-grid cell assignment changes for parameter B, sampled only at stations 18, 20 and 22:

			18	18	18	20	20	20	20	20	22			
			18	18	18	20	20	20	20	20	22	22	22	22
18	18	18	18	18	18	20	20	20	20	20	22	22	22	22
18	18	18	18	18	18	18	20	20	20	22	22	22	22	
18	18	18	18	18	18	18	20	20	20					

n Actual location of station n

n Station n assigned to that grid cell

Figure 2. Station-grid cell assignment.

ALDAR DOCUMENTATION

Line(s)	Description
24-104	Sets up schemas for S2K STAR data base.
111-262	Attaches the data base and fulfills the requirements of the job submitted; reads in year and cruise desired, the parameter codes requested, zones to be excluded and standard depths over which to integrate; checks array limits; sets up bathymetry map; sets constants for locating stations on bathymetry map.
113	Reads from user input (cards or remote batch) the data base specifications (password, name, where located); calls up corresponding packs and reads data base.
135	Reads in number of parameters requested and whether actual observations in each zone are to be printed.
139	On output writes title ("ALDAR") and the number of parameter codes; proceeds to write whether the actual observations are to be printed.
148	Reads those zones which are to be excluded from this run.
151	Writes on output the excluded zones.
155	From TAPE30 (the zoned bathymetry file) reads name of lake; number of rows, number of columns and the grid cell size of the bathymetry map; and number of zones in the lake.
159	From input reads in standard depths (in metres) over which depth-weighting to occur.
165	Counts the number of standard depths (KDM) (up to 20 depths) and lists these on output.
175	Checks to ensure that number of zones is < 25, number of rows in bathymetry file is < 300, and the parameter list does not exceed 50 codes.
186	Reads the cruise reference number and the year of the cruise desired.
193	Calls subroutine LIBRARY which reads the codes dictionary containing all the codes for each year. ALDAR then reads in the specified parameter codes from the user input and retrieves the number of decimal places and abbreviated code name for each code. *Note:* I is a code counter. ICØDE (I) is the list of codes for the year. INCØDE (I) is the specified list of codes for this run.
203	On output lists parameter codes for this run.
214	Calls up ZERØV which creates an array of zeros; defines IPØS which counts code numbers.
218	Calls up subroutine CØN1 which locates the code numbers specified by means of a binary search.
223	Reads from input the zones and depths specified for the summary report and prints these on the output.
247	Validates cruise and locates the stations for the cruise.

257	Calls subroutine SELECT which retrieves the desired lake and sets the constants for determining the station locations with respect to the cell grid (constants are used in the equations of lines 305 and 306).
262	Calls subroutine BATHY.

Subroutine BATHY

This subroutine reports the zone to which each cell in the lake belongs, the mean depth of each cell, and determines, at each of the standard depths, the number of cells in each zone.

Line(s)	Description
14	Attaches TAPE30, the zoned bathymetry file, reading IZBØ: IZBØ is comprised of $\frac{\text{zone-depth}}{\text{zone number}}$ for cell N.
19	Defines IXBØ as the (integer) depth of cell N. *Example 1* IXBØ = MOD (IZBØ, 1000) $= IZBØ - \frac{(IZBØ)}{1000}\ 1000$ = 17124* − 17000 = 124 *IZBØ = 17124, i.e. cell zone = 17, cell depth = 124
23	Converts from integer to real depth.
27	Defines NC as grid cell zone (= NØ(J)). *Example 2* NC = IZBØ /1000 NC = 17124/1000 = 17 *Note:* If IXBØ = 0, that grid cell is on land and it is assigned to zone 0 (line 21).
34	If the cell zone, NC, corresponds to KØUT, a zone specified by the user to be eliminated, that zone number is reset to 0 (NØ(J) = 0).
42	For all non-eliminated zones, determines the number of grid cells at each standard depth (NHYP) in each zone. For zone NC, by standard depth: If the depth of the cell (ZW) is less than standard depth (KD), it is excluded for the rest of the standard depths; if it is greater than that depth or equal to it, however, the number of cells for zone NC (NHYP (KD, NC)) increases by 1 and likewise NHYP for zone 25 (the whole lake) increases by 1.

51 The zones for each cell are written on TAPE35.

54 Returns to ALDAR.

ALDAR (CONT.)

Line(s)	Description
265-395	ALDAR proceeds one station at a time. Locates station on zoned bathymetry map. Retrieves EBT data and all parameter values at all depths (for that station) and stores information in PAR (TAPE1). Continues until all data for all stations on TAPE1.
294	DDDMMSS of latitude and longitude changed to fraction by dividing minutes by 60 and seconds by 3600.
303	Using the reference starting latitude and longitude, and the lake constants designated in subroutine SELECT, station indices X and Y (in kilometres) for locating stations on grid cell map are determined.
308	Defines IS and JS as coordinates on the grid map, taking grid cell size into account.

Example 3

Station 39

latitude 43°29′12″, longitude 78°00′00″

XLAT = 43.4867 XLØNG = 78.0000

from SELECT, G = 1.82

P = .322

X = 148.0 km Y = 34.2 km

$$\left.\begin{aligned} IS &= \left(X + \frac{\text{grid size}}{2}\right)/\text{grid size} = 74.5 \\ JS &= \left(Y + \frac{\text{grid size}}{2}\right)/\text{grid size} = 17.5 \end{aligned}\right\} \text{exact grid coordinates}$$

315 Reads TAPE35, the zones associated with each grid cell.

Note: If the cell zone = 0, that cell is disregarded for the rest of this procedure.

321 Defines XSTAT (LIN), YSTAT (LIN) and ACTST (LIN) to store the x and y coordinates and PSN for the (LIN)th station.

334 If the program is not being run for EBT data, proceeds to line 347; if just EBT (code 100 or 104) wanted, retrieves EBT data; T(J) and Z(J) are the 9-point digitization temperature and depth values, respectively, for the Jth depth.

356 Retrieves codes from C102 and stores them in NCØDE; ICD is a code counter.

363 The array PAR contains all the data for all the depths for all parameters. The array is set up such that column 1 contains the actual sampling depths (in metres); the remaining code values are stored in succeeding columns.

Example 4

Station 014

Depth	Temperature	DO_2	pH
1.0	5.18	12.53	7.98
10.0	5.18	12.55	7.95
20.0	–	–	–
25.0	5.18	12.58	7.93
87.5	5.06	12.68	7.90
95.5	5.04	12.39	7.88

These data would be stored in PAR as follows:

column 1 (=DEPTHS)	column 2 (=TEMP)	column 3 (=DO2)	column 4 (=PH)
1.0	5.18	12.53	7.98
10.0	5.18	12.55	7.95
20.0	-1.0	-1.0	-1.0
25.0	5.18	12.58	7.93
87.5	5.06	12.68	7.90
95.5	5.04	12.39	7.88
-1.0	-1.0	-1.0	-1.0

Note: A value of (-1.0) means no data.

Thus far, all the depth and parameter data for a single station are stored on PAR. If only EBT's are requested they are transferred to the array PAR. If the EBT's are not available, however, the depth and temperature values for the station are used.

If EBT's are available for the station and are requested:

Line(s)	Description
386	Sets columns 1 and 2 of PAR equal to EBT 9-point digitization depth (Z(J)) and temperature (T(J)) values, respectively.
395	The permanent station number and all the depth/parameter values for that station are written on TAPE1.
397	This continues until data for all stations are on TAPE1.

403-427	ALDAR proceeds one parameter at a time. Prints parameter name and code number on output and lists standard depths. Rewinds TAPE35 which contains the zone number associated with each cell in the lake and TAPE36 which will contain the station number associated with each cell.
431	Calls subroutine REPØRT.

Subroutine REPØRT

Subroutine REPØRT calls up another subroutine, INTRPØL, which calculates the interpolated parameter values at each of the standard depths specified by the user. Subroutine REPØRT then lists these values, by permanent station, on the output. The information is stored on TAPE2 in array TH. Note that the program is still proceeding one parameter at a time.

Line(s)	Description
12	Creates array TH (standard depth, PSN) which is to store the interpolated values of the parameter at the standard depths. Sets all the elements to (-1.0).
23	Reads TAPE1 which stores the actual observations and sampling depths.
29	Proceeds one station at a time.
30	Calls subroutine INTRPØL.

Subroutine INTRPØL

Line(s)	Description
15	Calls up ZERØV and sets arrays PARAM (actual parameter observations) and DEP (actual sampling depths) to zero.
18	Recall that a value of (-1.0) means no data; thus, program proceeds to next depth.
20	If data exist at that depth stores parameter value in array PARAM and sampling depth in array DEP.
23	Defines row 1 of array TH to be the values of the first parameter.
28	On TAPE2 writes station counter, observed parameter value and corresponding sampling depth.
33	If there is only one sampling depth (N = 1) and the code number = 124, 225, 267, 613 or 614 (all integrated parameters), go back to REPØRT (i.e. do not interpolate).
39	If there is only one sampling depth, yet it is not one of the code numbers above, DEP(2) = DEP(1) and the two parameter values are equal, PARAM(2) = PARAM(1).

51 Calculates the interpolated values for the parameter, IP, at the standard depths, L.

Case (i) Sampling depth = standard depth
—TH assumes value of PARAM.
—Loops back and L increases by 1.

Case (ii) Sampling depth < standard depth (L< KDM)
—Loops back and sampling depth number J increased by 1.

Case (iii) Sampling depth < standard depth (L = KDM)
—TH for that station at that depth = −1.0.
—Number of depths for that station decreased by 1.
—Returns to REPØRT.

Case (iv) Sampling depth > standard depth
—TH for that station (IN) at depth L redefined as:

$$TH(L,IN) = PARAM(J-1) + \frac{(PARAM(J)-PARAM(J-1)) \times (DEPTH(L)-DEP(J-1))}{DEP(J)-DEP(J-1)}$$

Example 5

J	SAMPLING DEPTH	OBSERVED VALUE	L	STANDARD DEPTH	CALCULATED VALUE(TH)
1	1.0	2.5	2	1.0	(a)
2	5.0	2.0			
			3	10.0	(b)
3	15.0	1.4			

(a) As in case (i), sampling depth = standard depth
TH (2,IN) = PARAM(1) = 2.5

(b) As in case (iv), TH (3,IN) redefined:

$$TH(3,IN) = 2.0 + \frac{(1.4-2.0)\ (10.0-5.0)}{15.0-5.0} = 1.7$$

66 When all the standard depths have been assigned values for that parameter and station, the program returns to subroutine REPØRT.

Subroutine REPØRT (Cont.)

Line(s)	Description
35	If that station has data for that parameter, NSTP assigns a consecutive number (INP) to the station.
39	If only EBT data requested (NUMPAR=1), IC is assigned the first (and only) code number (must be 100 or 104).

42, 49	On output, prints PSN's and interpolated parameter values at the standard depths for all stations (for a single parameter).
45	IC assigned the various parameter code numbers (IP).
46	Makes provision for exponential values.
44, 50, 53	Continually loops back until all stations completed. TAPE2 now contains the interpolated parameter values at the standard depths for all stations (for one parameter only).
60	Returns to ALDAR.

ALDAR (CONT.)

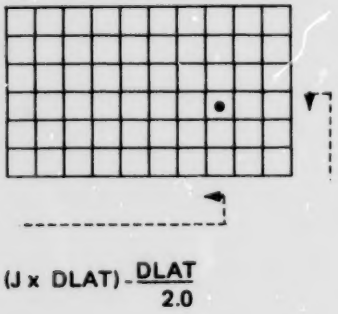
Line(s)	Description
435	Calls subroutine FILL.

Subroutine FILL

This subroutine assigns a station number to each cell in the lake based on the proximity of a station (with data for the current parameter) to that cell.

Line(s)	Description
10	Defines DL2 as half the grid cell size.
12	Reads the zones associated with each grid cell.
13, 15	XØ, YØ locate the cell, then centres the location.

Example 6



$$(I \times DLAT) - \frac{DLAT}{2.0}$$

$$(J \times DLAT) - \frac{DLAT}{2.0}$$

XO and YO are then the co-ordinates of the midpoint of the current grid cell.

16	If the zone number assigned to that cell = 0 (i.e. it is land or eliminated), loop back to next cell.
19	L is a station counter (recall that NSTP assigns a consecutive number to each station). If L = 0 that station has no data for that parameter. Loop back to look at next station. *Otherwise:*

21	Defines DX = XSTAT (L) - XØ DY = YSTAT (L) - YØ where XSTAT and YSTAT are the station grid cell coordinates. Therefore, DX and DY represent the distance between the midpoint of a given cell and any station location and
23	$D2 = DX^2 + DY^2$
28	DISTØ is defined sufficiently large (10^6) so that D2 will always replace it until, eventually, the least distance is found (KNEAR). The nearest station is then assigned to that cell.
33	The stations associated with each cell (for that parameter) are then written on TAPE36.
37	Returns to ALDAR.

ALDAR (CONT.)

Line(s)	Description
436	If stations exist with data for that parameter, calls subroutine INTEGRT.

Subroutine INTEGRT

This subroutine integrates the following averages: layer and integrated quantity, layer and integrated volume, area-weighted depth values, and volume-weighted values for layer and column; these values are then printed on output. Note that program is still proceeding one parameter at a time.

Line(s)	Description
21	Calls ZERØV and sets both THSUM and NSUM to zero to accommodate new parameter.
24	Reads zone associated with each grid cell (TAPE35) and station associated with each cell (TAPE36).
29	If cell zone = 0 proceeds to next cell.
30	Defines NC as cell zone, INS as cell station.
33	Disregards missing data.
32-36	For each depth specified by the user, sums the individual cell values in the zone and the total number of cells. The sum divided by the total number of cells will give the area-weighted mean value (line 93) for that zone.
34	Defines THSUM as: THSUM (standard depth, zone) = THSUM (K,NC) + TH (standard depth, station) Parameter sum total for zone (NC) of parameter at standard depth (K) — Parameter value for standard depth (K) at cell station (INS)

35	Defines NSUM as: NSUM (standard depth, zone) = NSUM (K,NC) + 1 Total number of cells included in zone (NC) calculations at standard depth (K)
41-85	Proceeds one grid cell at a time. Determines both the zone in which the station (cell) *exists* and the zones that are *affected* by that station.
41	Calls ZERØV and sets both NZ, the zones affected by a particular station, and INACT, the zone in which the station is located, to zero to accommodate the new parameter.
46	Again reads zone and station associated with each cell and eliminated zones.
57	Defines NS as station counter.
63	Determines which zones (NZ) are affected by the station NS.
68	Once a zone is found that is affected by station NS, program proceeds to check the position of the station and store, in INACT, the zone where the station actually is.
89	Calculates area-weighted values for each depth in zone J.

From this point the program proceeds one zone at a time.

Line(s)	Description
92	If total number of cells in zone at standard depth I = 0 (i.e., the zone is eliminated or bottom hit) leaves loop and proceeds to line 98; that depth then is defined as bottom of zone.
93	Redefines THSUM to be the average value at standard depth I for zone J, i.e., $\text{THSUM} = \frac{\text{Parameter sum total at standard depth I for all cells in zone J}}{\text{Total number of cells at standard depth I in zone J}}$
94	For the entire lake (= zone 25) THSUM = THSUM (I,25) + (THSUM(I,J) × NHYP(I,J)) i.e., the average value at standard depth I for the whole lake is the sum total of the zone average value multiplied by the number of cells at that depth for each zone, respectively.
95	Likewise NSUM for the whole lake is the sum total of the cells in each zone at standard depth I.
98	Defines MAXD as maximum number of standard depths in a zone before bottom reached.
104	On output lists eliminated zones.
107	If there is at least one standard depth with data for that parameter and zone, sets QUANT = VØL = NØBS = 0.
121	On output lists cruise reference number, zone, abbreviated code name and code number for parameter being studied, sets up output table by printing headings: area-weighted mean value, area, layer quantity, layer volume, etc.; into table enters DEPTH (1) value (=0.0), THSUM (area-weighted mean value) and NHYP (area) for first standard depth, the integrated quantity (QUANT = 0.0) and integrated volume (VØL = 0.0) for DEPTH (1).

133 Defines bottom standard depth for zone. Recall that if samples were taken above and below standard depth, data exist for THSUM; otherwise THSUM = 0.0. Therefore, if there are no data at MAXD, redefines it to M-1, the previous standard depth.

140 Skips m = 1 value, since first depth is always 0.0 m. Calculates remaining values.

141 If NHYP = 0, bottom of the zone has been reached.

The subroutine now defines the calculations and terms used in the output. An example of all the calculations is given in Example 7, which follows.

Line(s) **Description**

143 Defines DELC as difference (in metres) between the two specified depths.

144 Defines the integrated quantity, DELQ as:

$$DELQ = \frac{DELC}{3}\left\{(NHYP(M,J) \times THSUM(M,J)) + (NHYP(M-1,J) \times THSUM(M-1,J)) + \frac{(NHYP(M-1,J) \times THSUM(M,J)) + (NHYP(M,J) \times THSUM(M-1,J))}{2.0}\right\}$$

146 Defines QUANT, the layer quantity, as the sum of the integrated quantity for that depth plus the layer quantity for the previous depth.

147 Defines the integrated volume, DELV, as

$$DELV = \frac{DELC}{2}(NHYP(M,J) + NHYP(M-1,J))$$

148 Defines the layer volume, VØL, as the sum total of the integrated volume at that depth plus the layer volume from the previous depth.

149 Defines the volume-weighted column value, QMEAN, as the integrated quantity divided by the integrated volume:

$$QMEAN = \frac{DELQ}{DELV}$$

150 Defines the volume-weighted layer value, QCØL, as the layer quantity divided by the layer volume:

$$QC\emptyset L = \frac{QUANT}{V\emptyset L}$$

151 All the values mentioned above are printed on the output.

Example 7

(DEPTH) DEPTH (m)	(THSUM) AREA-WEIGHTED MEAN VALUE (mg/L)	(NHYP) AREA (m^2)	(QUANT) LAYER QUANTITY (g)	(DELQ) INTEGRATED QUANTITY (g)	(VØL) LAYER VØLUME (m^3)	(DELV) INTEGRATED VØLUME (m^3)	(QCØL) VØLUME-LAYER (mg/L)	(QMEAN) WEIGHTED CØLUMN (mg/L)
0.00	10.9639	187		0.		0.		
			2050.2493		187.		10.9639	
1.00	10.9639	187		2050.2493		187.		10.9639
5.00	10.0148	179						

Note: Those values underlined were also calculated by the subroutine. The 5.0-m calculations, however, were used in this example for clarity.

$$DELC = (5.0) - (1.0) = 4.0$$

$$DELQ = \frac{4.0}{3}\left\{(179) \times (10.0148) + (187) \times (10.9639) + \frac{(187) \times (10.0148)}{2.0} + \frac{(179) \times (10.9639)}{2.0}\right\}$$

$$= 7680.7351$$

$$QUANT = (7680.7351) + (2050.2493)$$

$$= 9730.9844$$

$$DELV = \frac{4.0}{2}(179 + 187)$$

$$= 732.$$

$$VØL = (732.) + (187.)$$

$$= 919.$$

$$QMEAN = \frac{(7680.7351)}{(732.)}$$

$$= 10.4928$$

$$QCØL = \frac{(9730.9844)}{(919.)}$$

$$= 10.5887$$

Output with new values incorporated:

DEPTH (m)	AREA-WEIGHTED MEAN VALUE (mg/L)	AREA (m^2)	LAYER QUANTITY (g)	INTEGRATED QUANTITY (g)	LAYER VOLUME (m^3)	INTEGRATED VØLUME (m^3)	VØLUME-LAYER (mg/L)	WEIGHTED CØLUMN (mg/L)
0.00	10.9639	187		0.		0.		
			2050.2493		187.		10.9639	
1.00	10.9639	187		2050.2493		187.		10.9639
			9730.9844		919.		10.5887	
5.00	10.0148	179		7680.7351		732.		10.4928

Note: The value 10.9639 mg/L represents the volume-weighted concentration from the surface to 5.0 m in this zone; the value 10.5887 mg/L represents the volume-weighted concentration between 1.0 and 5.0 m in this zone. Likewise the quantity 9730.9844 g is that amount of the parameter found in the first 5.0 m, whereas 7680.7351 g is the quantity found between 1.0 and 5.0 m.

156 For ALDREPS, the file containing the data to produce the summary report, collects the 1.0-m values for each zone (including 25).

157 For those parameters not measured at discrete depths (i.e., transmission, Secchi disk, all integrated parameters), the data are stored under the 0.0-m depth; the 1.0-m value = 0.0. Therefore directs the program to read row 1 of THSUM.

158 Continues this loop until it reaches the zone specified for additional zone-depth data in the summary report; then collects the specified depth data and stores it on ALDREPS.

168 Defines QUANTT, the quantity of that parameter in the lake, as

QUANTT (kg)	=	VOL volume of lake (m^3)	x	THSUM(M,J) value at bottom depth (mg/L)	x	1000. converted to kilograms	x	$(DLAT)^2$ grid cell size (km)

172 LINE is a counter for the printer to print out column headings if required when new page started.

181 Loops back to get next depth.

182 Advances to one depth beyond that identified previously as bottom.

183 If there is no value for THSUM but there is still more area (NHYP≠0.), prints standard depth and area value on output.

188 If actual observations in each zone, at each station and depth, are to be printed, continue; otherwise go to program line 115.

If it is requested that the actual observations be listed, the procedure from line 189 to 246 is followed.

Line(s)	Description
189	Subroutine ZERØV called up and ACTØB and ACTDP set to zero to accommodate new zone.
198	Proceeds one station at a time; reads actual parameter values and their depth from scratch file 2 for each station.
200	Checks validity of station number.
201	Assigns consecutive number to station.
203	If zone associated with that station is eliminated, gets next station; if zone is not eliminated, determines whether station affects present zone being studied and proceeds to copy actual depth and observation data onto arrays ACTØB and ACTDP; permanent station numbers are put into ACSN.

208	MM are the sampling depths. If the observation at that station and depth = 0., get the next depth (until all 25 are exhausted); if the value ≠ 0., the number of observations affecting calculations in that zone (NØBS) increases by 1.
215	Defines ACTØB as the array containing the actual observations for that zone.
216	Defines ACTDP as the array containing the actual sampling depths.
217	If that station exists in the zone, add the station number, with an asterisk, to ACSN.
218	If the station does not exist in the zone but affects it, that station is added to ACSN without an asterisk.
221	Loops back to get next sampling depth.
223	After all stations are finished, prints out the number of observations affecting calculations in zone and informs user that actual values in zone are marked with asterisks.
236	Lists stations, observations and associated depths on printout.
247	Because there is only space for 13 observations across the page, loops back to pick up the rest of the observations (in multiples of 13) until all printed.
248	Continues to loop back until all zones done; when reaches zone 25, calculates NSUM and THSUM for whole lake at each standard depth then loops back to calculate QUANT, VØL, etc.
	When even zone 25 is finished, proceeds to program line 150 and lists excluded zones.
259	Returns to ALDAR.

ALDAR (CONT.)

Line(s)	Description
439	Calls subroutine SUMRY.

Subroutine SUMRY

This subroutine has two purposes. At the end of each parameter run for a cruise, it lists (by zone) the 1-m values for that parameter plus any additional depth data the user may have requested for specific zones (labelled I17, I25). Secondly, it stores all this information on TAPE4 so that summary tables can be generated, for any given parameter, listing all the cruise data.

Line(s)	Description
12	On output and TAPE4 writes year, lake, code name and code number, cruise number and inclusive dates.
24	Eliminated zones are excluded from output.
28	On output and TAPE4 writes zones and respective 1-m values for parameter.

36	Zone 25 value is listed, separated from rest of output by horizontal dashes.
41	For integrated parameters there can be no further depth data; proceeds to end of program and closes TAPE4.
46	If I17 = I25 = 0 (i.e., no further depth data requested for that parameter) proceeds to end of program and closes TAPE4.

If further depth data have been requested for specific zones, proceeds as follows:

Line(s)	Description
48	For each depth specified for zone I17: defines M as that depth, if M is the bottom depth writes "BØTTØM" and associated depth value on output and TAPE4, otherwise lists the depth and value.
67	Repeats this procedure for zone I25.
86	The next step is to list the quantity of that parameter found in the lake. This is meaningless if the parameter is temperature (code 104), specific conductance (160) or percent saturated oxygen (247). Recall, also, that this part of the program was left out for the integrated parameters, since those values do not represent lakewide conditions. Proceeds to program line 15 to close TAPE4 for these parameters.
88	Lists QUANT (quantity of parameter) on output and TAPE4.
94	Resets Z17, Z25 and QUANT to 0. for next parameter.
100	Returns to ALDAR.

ALDAR (CONT.)

Line(s)	Description
440	Loops back to get next parameter until all parameters run.

REFERENCES

Robertson, D.G. and D.E. Jordan. 1978. Digital bathymetry of Lakes Ontario, Erie, Huron, Superior and Georgian Bay. Canada Centre for Inland Waters. Unpublished report.

Rodgers, G.K. 1969. Data atlas project, progress report prepared for the CCIW under purchase order No. H083836. Great Lakes Institute, University of Toronto.

Appendix A
Functions of Tapes Used by Program ALDAR

Functions of Tapes Used by Program ALDAR

The functions of tapes used by program ALDAR follow:

TAPE60:	Input from batch submission of ALDAR.
TAPE61:	Final ALDAR output.
TAPE1:	Stores permanent station number (PSN), actual depth/temperature data, and parameter observations at all depths for all stations.
TAPE2:	Stores interpolated values for each of the standard depths at all stations (for one parameter only).
TAPE10:	Library tape storing code names, code numbers, abbreviated code names and respective number of decimal places.
TAPE30.	Zoned bathymetry file for each lake (in binary).
TAPE35:	Zones associated with each grid cell.
TAPE36:	Stations associated with each grid cell.
TAPE4:	Summary report information.

Appendix B
System 2000 Variable Definitions

System 2000 Variable Definitions

The following variables, specific to System 2000, store the actual cruise information:

Variable	Line No.	Definition
C1	244	Cruise reference number
C7	285	Date first station sampled
C8	286	Date last station sampled
C51	294	Latitude of station
C52	298	Longitude of station
C59	323	Permanent station number (PSN)
C63	337	Are there electrobathythermograph (EBT) data? "NUL"= NO.
C81	344	EBT temperature data
C82	345	EBT depth data
C102	356	Parameter codes measured
C101	361	Depths sampled
C104	370	Parameter values observed

Appendix C
Program Variable Definitions

Program Variable Definitions

The variables used in this program, their definition, and the line number where they were first encountered follow:

Program	Variable	Line No.	Definition
Main Program–ALDAR	IPASSWD	113	Data base password
	DBNAM	113	Data base name
	IPACKF	113	Are files on private pack?=0 No,= 1 Yes
	IPACKN	113	Pack name
	IUSER	113	User number data base created under
	NUMPAR	135	Number of parameters to be read (<50)
	NACT	135	Are actual observations to be listed? =0 No, = 1 Yes
	NØUT	148	Number of zones to be excluded
	KØUT	148	Actual zones to be excluded
	LAKE	155	Lake to be studied
	ICØLMN	155	Number of columns on grid map
	IRØW	155	Number of rows on grid map
	IZØNES	155	Number of zones in lake (<25)
	DLAT	155	Grid cell size in kilometres
	DEPTH	159	Specified standard depths (<20)
	KDM	164	Counter for standard depths

Program	Variable	Line No.	Definition
Main Program–ALDAR	IPØS (I)	181	IPØS (parameter code) = code counter. IPØS is an array that stores the parameter codes
	ICRN	186	Cruise reference number
	IYR	186	Year of cruise
	INCØDE (I)	201	Specified parameter code numbers
	I17	223	First zone to be summarized in summary report
	IDZ17 (J)	223	Standard depth numbers (e.g., first depth, third depth) to be summarized for zone I17 (up to five depths)
	I25 (=25)	230	Second zone to be summarized in the summary report (must be zone 25)
	IDZ25 (J)	230	Standard depth numbers to be summarized for zone I25 (up to five depths)
	LIN	267	Station counter (i.e., those stations not eliminated)
	NS	268	Total number of stations
	C51	294	Station latitude in DDDMMSS
	XLAT	297	Station latitude in DD.MMSS
	C52	298	Station longitude in DDDMMSS
	XLØNG	301	Station longitude in DD.MMSS
	XSTIN XSTAT	305	X and Y coordinates for mapping station on grid cell map (first step)
	YSTIN YSTAT	306	
	IS	308	Exact grid cell coordinates for station
	JS	309	
	PERM	323	Permanent station number, PSN
	ACTST (LIN)	324	Array storing PSN's corresponding to station indices XSTAT and YSTAT

Program	Variable	Line No.	Definition
Main Program—ALDAR	T (J)	325	EBT temperature
	Z (J)	326	EBT depth
			Note: J = 1, 9 because there are 9 (depth, temperature) co-ordinates in the digitization of the EBT trace
	PAR (JJ,I)	329	Array to store the station value for parameter J, at sampling depth number JJ
			Note: PAR (depth number, 1) = depth in metres PAR (depth number, parameter code counter + 1) = parameter value
	ICD	358	Parameter code counter
Subroutine LIBRARY	ICØDE (I)	8	Library code numbers
	IFAC (I)	8	Number of decimal places reported for parameter
			Note: 99 means exponential
	ABRS (I)	8	Abbreviated code name for parameter
	NØSCØDE	8	Total number of parameter codes
Subroutine SELECT	PHIM	16	Starting latitude point (reference point)
	GM	16	Starting longitude point (reference point)
Subroutine BATHY	IZBØ (J)	14	Array storing the zone and depth information for each cell
			Note: Zone and depth are stored as a single unit of information, e.g., if cell 14 is in zone 5 and depth = 123 m, IZBØ (14) = 05123. When the depth is eliminated, IZBØ is later used to store the cell zone number only.
	IXBØ	19	Depth of cell (integer value)

Program	Variable	Line No.	Definition
Subroutine BATHY	NØ (J)	21	Zone number assigned to cell (if zone eliminated, NØ (J) = 0) *Note:* NC is actual zone in which cell resides
	ZW	23	Depth of cell (real)
	NHYP (KD, NC)	44	NHYP (standard depth number, actual zone)—array storing the number of grid cells, at each of the standard depths, in each zone
Subroutine REPØRT	TH (L, M)	12	TH (standard depth, PSN) = interpolated parameter value Array containing standard depth data of the current parameter for the permanent stations
	INP	28	"Consecutive" station number assigned to each station by NSTP
	NSTP (IN)	35	Assigns a consecutive number to each station that has data for the current parameter
	NK	35	Total number of standard depths (including 0.0 depth) at a PSN
Subroutine INTRPØL	PARAM	15	Actual parameter observation at DEP
	DEP (J)	15	Actual sampling depth (in metres)
	DEPTH (L)	72	Specified standard depth (in metres)
Subroutine INTEGRT	NC	30	Cell zone number
	INS	31	Cell station number
	THSUM (K, NC)	34	THSUM (standard depth number, cell zone number) = parameter sum total at standard depth number K for all cells in zone NC *Note*: Later THSUM is used to store average parameter value at depth K for one cell in zone NC
	NSUM (K, NC)	35	Total number of cells, at standard depth K, included in calculation of THSUM for zone NC

Program	Variable	Line No.	Definition
Subroutine INTEGRT	NZ (NS,I)	64	NZ (station number consecutive zone number) Array storing zones which use data from this station in its calculations
	INACT (NS)	82	Stores the zone, NC, in which each station, NS, is located
	MAXD	98	Maximum number of standard depths for zone before bottom hit
	QUANT	107	Layer quantity
	VØL	108	Layer volume
	NØBS	109	Number of observations affecting calculations in zone J
	DELC	143	Difference between two standard depths (in metres)
	DELQ	144	Integrated quantity
	DELV	147	Integrated volume
	QMEAN	149	Volume-weighted column value (i.e., from surface to depth K)
	QCØL	150	Volume-weighted layer value (i.e., from depth (K) to depth (K +1))
	WAREA (J)	156	The area-weighted value for zone J (to be used in summary report)
	Z17 (I)	160	For summary report, the value at standard depth, I, of the first specified zone
	Z25 (I)	165	For summary report, the value at standard depth, I, of zone 25 (whole lake)
	QUANTT	168	Quantity of parameter in lake
	ACTØB	189	Actual sampling observations affecting zone
	ACTDP	190	Actual sampling depths affecting zone

Program	Variable	Line No.	Definition
Subroutine INTEGRT	ACSN	191	Stations (PSN's) affecting calculations in zone
	NST≡NS	193	Station numbers
	XNØB	196	Actual observed parameter value (stored on TAPE2)
	NSTT≡INP	201	Consecutive station number for actual sampling station
	NSZ	202	Consecutive zone number
	NØBS	208	Number of observations affecting calculations in zone

Appendix D
Program ALDAR with Subroutines

```
      CALDAR
            PROGRAM ALDAR (INPUT=64,OUTPUT=64,TAPE60=INPUT,TAPE61=OUTPUT,
           1  TAPE1=512,TAPE2=512,TAPE10=512,TAPE30,TAPE35=512,TAPE36=512,
           1  TAPE4=64)
C
C     PROGRAM ALDAR CALCULATES VOLUME WEIGHTED AVERAGES FOR LAKE ZONE
C     DATA BY ARBITARY REGIONS.
C
      INTEGER C51,C52,C7,C8
      DIMENSION IPOS(1000),ITITLE(8),T(9),Z(9),A(5),B(5)
      COMMON /STAT/ ICRN,INCODE(50),TH(20,200),NSTP(200),ACTST(200),
     1              NACT,PAR(25,51)
      COMMON /IN/ KDM,DEPTH(24),NOUT,KOUT(20),IZONES
      COMMON /MAP/ NO(300),,ROW,ICOLMN,IZBO(300),NHYP(20,25)
      COMMON /VARS/ XSTAT(200),YSTAT(200),LIN,DLAT
      COMMON /CON/ ICODE(350),IFAC(350),ABRS(350),NOSCODE
      COMMON /SUM/ WAREA(25),Z17(5),Z25(5),IDZ17(5),IDZ25(5),
     1  QUANT,I17,I25
C
C  SET UP SCHEMAS FOR S2K STAR DATA BASE
C
CPL   COMMBLOCK/DBNAM/ISCHME,IRTNCD,DFILL,LASTS,IPASSWD,IDATAS,
CPL  1  IDATAP,LEVEWL,ITIME,IDATE,ICYCLE,ISEPSV,IENT,ISTA.
      COMMON/DBNAM/DBNAM
      INTEGER DBNAM(21),ISCHME(3),IRTNCD,DFILL,LASTS,IPASSWD,IDATAS,
     -IDATAP,LEVEWL,ITIME,IDATE,ICYCLE,ISEPSV,IENT,ISTA
      EQUIVALENCE (DBNAM(6),ISCHME(1)),(DBNAM(9),IRTNCD),(DBNAM(10),
     -DFILL),(DBNAM(11),LASTS),(DBNAM(12),IPASSWD),(DBNAM(13),IDATAS),
     -(DBNAM(14),IDATAP),(DBNAM(15),LEVEWL),(DBNAM(16),ITIME),
     -(DBNAM(17),IDATE),(DBNAM(18),ICYCLE),(DBNAM(19),ISEPSV),
     -(DBNAM(20),IENT),(DBNAM(21),ISTA)
CPL   SCHEMA/CRUISE OF DBNAM/C1,C7,C8.
      COMMON/CRUISE/CRUISE
      INTEGER CRUISE(27)
      EQUIVALENCE (CRUISE(25),C1),(CRUISE(26),C7),(CRUISE(27),C8)
CPL   SCHEMA/STAT OF DBNAM/C51,C52,C59,C63.
      COMMON/STAT/STAT
      INTEGER STAT(34)
      EQUIVALENCE (STAT(31),C51),(STAT(32),C52),(STAT(33),C59),
     -(STAT(34),C63)
CPL   SCHEMA/DEPPAR OF DBNAM/C101,C102,C104.
      COMMON/DEPPAR/DEPPAR
      INTEGER DEPPAR(27)
      EQUIVALENCE (DEPPAR(25),C101),(DEPPAR(26),C102),(DEPPAR(27),C104)
CPL   SCHEMA/BTS OF DBNAM/C81,C82.
      COMMON/BTS/BTS
      INTEGER BTS(20)
      EQUIVALENCE (BTS(19),C81),(BTS(20),C82)
CPL   $BLOCKS.
      COMMON/S2KDUM/S2KDUM(35)
      INTEGER S2KDUM,S2KDU1,S2KRTC,S2KCNT,S2KDU2,S2KDU3,S2KDU4,S2KDU5,
     -S2KDU6,S2KDU7,S2KDU8,S2KDU9,S2KDU11,S2KSRT,S2KLKH(10)
      EQUIVALENCE(S2KDUM(1),S2KDU1),(S2KDUM( 2),S2KRTC),(S2KDUM( 3),
     -S2KCNT),(S2KDUM( 4),S2KDU2),(S2KDUM( 5),S2KDU3),(S2KDUM( 7),
     -S2KDU4),(S2KDUM(14),S2KDU5),(S2KDUM(15),S2KDU6),(S2KDUM(16),
     -S2KDU7),(S2KDUM(20),S2KDU8),(S2KDUM(21),S2KDU9),(S2KDUM(22),
     -S2KSRT),(S2KDUM(23),S2KDU11),(S2KDUM(26),S2KLKH(1))
      INTEGER S2R1(2)
      DATA DBNAM/10HDBNAM     ,10H           ,0,21,17*0/
      DATA CRUISE(1),CRUISE(2),CRUISE(3),CRUISE(4),CRUISE(5),
     -CRUISE(6)/10HCRUISE    ,10H           ,10H           ,3,0,16777219 /
      DATA CRUISE(7),CRUISE(8),CRUISE(9),CRUISE(10),CRUISE(11),
     -CRUISE(12) /10HC1      ,10H           ,10H           ,100,0,
     -2097162 /
      DATA CRUISE(13),CRUISE(14),CRUISE(15),CRUISE(16),CRUISE(17),
     -CRUISE(18) /10HC7      ,10H           ,10H           ,130,0,
     -2097162 /
      DATA CRUISE(19),CRUISE(20),CRUISE(21),CRUISE(22),CRUISE(23),
     -CRUISE(24) /10HC8      ,10H           ,10H           ,80,0,
     -2097162 /
      DATA STAT(1),STAT(2),STAT(3),STAT(4),STAT(5),
     -STAT(6)/10HSTAT        ,10H           ,10H           ,4,0,16777220 /
      DATA STAT(7),STAT(8),STAT(9),STAT(10),STAT(11),STAT(12)
     -/10HC51      ,10H           ,10H           ,240,0,2097162 /
      DATA STAT(13),STAT(14),STAT(15),STAT(16),STAT(17),STAT(18)
     -/10HC52      ,10H           ,10H           ,190,0,2097162 /
      DATA STAT(19),STAT(20),STAT(21),STAT(22),STAT(23),STAT(24)
```

```
      -/10HC59       ,10H           ,10H           ,140,0,2097162 /
       DATA STAT(25),STAT(26),STAT(27),STAT(28),STAT(29),STAT(30)
80    -/10HC63       ,10H           ,10H           ,90,0,2097162 /
       DATA DEPPAR(1),DEPPAR(2),DEPPAR(3),DEPPAR(4),DEPPAR(5),
      -DEPPAR(6)/10HDEPPAR     ,10H           ,10H           ,3,0,16777219 /
       DATA DEPPAR(7),DEPPAR(8),DEPPAR(9),DEPPAR(10),DEPPAR(11),
      -DEPPAR(12) /10HC101       ,10H           ,10H           ,100,0,
85    -2097162 /
       DATA DEPPAR(13),DEPPAR(14),DEPPAR(15),DEPPAR(16),DEPPAR(17),
      -DEPPAR(18) /10HC102       ,10H           ,10H           ,130,0,
      -2097162 /
       DATA DEPPAR(19),DEPPAR(20),DEPPAR(21),DEPPAR(22),DEPPAR(23),
90    -DEPPAR(24) /10HC104       ,10H           ,10H           ,80,0,
      -2097162 /
       DATA BTS(1),BTS(2),BTS(3),BTS(4),BTS(5),BTS(6)/10HBTS
      -10H           ,10H           ,2,0,16777218 /
       DATA BTS(7),BTS(8),BTS(9),BTS(10),BTS(11),BTS(12) /10HC81
95    -10H           ,10H           ,120,0,2097162 /
       DATA BTS(13),BTS(14),BTS(15),BTS(16),BTS(17),BTS(18)
      -/10HC82       ,10H           ,10H           ,70,0,2097162 /
       DATA S2KDUM/5*0,1,2*0,1H ,10HR2.00D     ,10H 83/08/24..
      -10H 09.10.50.,10H           ,0,-1,10*0,10*-1/
100    DATA S2R1/2,143/
CPL    START S2K.
       S2KDU1=91
       S2KDU3=0
       CALL S2KPL1(S2KDUM)
105   C
      C  SET THE PRINTER TO 8 LINES/INCH
      C
       WRITE(61,40)
40     FORMAT(1HT)
110   C
      C  READ IN THE DATA BASE SPECIFICATIONS AND OPEN THE S2K DATA BASE
      C
       READ(60,5) IPASSWD,DBNAM(1),IPACKF,IPACKN,IUSER
5      FORMAT(A10,A10,I1,A4,1X,A3)
115    CALL USERDBX(2HDB)
       CALL ATTS2K(DBNAM(1),IPACKF,IPACKN,IUSER)
CPL    OPEN/READ DBNAM.
       S2KDU1=61
       CALL S2KPL2(S2KDUM, DBNAM)
120   C  CHECK RETURN CODE
       IF (IRTNCD.EQ.0) GO TO 6
       WRITE(61,7) IRTNCD
7      FORMAT(* DATA BASE CANNOT BE OPENED-RETURN CODE IS*,I7)
       GO TO 999
125   C  CHECK STATUS
6      IF (ISTA.EQ.0) GO TO 8
       WRITE(61,9) ISTA
9      FORMAT(* WARNING DATA BASE DAMAGED-STATUS=*,I2)
       GO TO 1999
130   8  CONTINUE
      C
      C      READ IN THE NO. OF PARAMETERS AND WHETHER ACTUAL OBSERVATIONS IN
      C      EACH ZONE WILL BE PRINTED
      C
135    READ(60,50) NUMPAR,NACT
50     FORMAT(I3,5X,I1)
       WRITE(61,150) NUMPAR
150    FORMAT(1H1,5HALDAR,/1H ,5H-----,
      1  /1H0,*NUMBER OF PARAMETER CODES = *,I2)
140    IF (NACT.EQ.0) WRITE(61,151)
151    FORMAT(1H0,*ACTUAL OBSERVATIONS IN EACH ZONE WILL NOT BE PRINTED*)
       IF (NACT.EQ.1) WRITE(61,152)
152    FORMAT(1H0,*ACTUAL OBSERVATIONS IN EACH ZONE WILL BE PRINTED*)
      C
145   C      READ IN THE ZONE NUMBERS THAT ARE TO BE EXCLUDED
      C      IN THE CALCULATIONS.
      C
       READ(60,51) NOUT,KOUT
51     FORMAT(I2,20I3)
150    IF(NOUT.NE.0) WRITE(61,160)NOUT,(KOUT(I),I=1,NOUT)
160    FORMAT(1H0,*THE FOLLOWING*,I3,* ZONES ARE EXCLUDED: *,20I3)
      C
      C      READ IN THE HEADER RECORD OF THE ZONE BATHYMETRY FILE.
      C
```

```
      READ (30) (ITITLE(N),N=1,8 ),LAKE,ICOLMN,IROW,IZONES,DLAT
C
C     READ IN THE STANDARD DEPTHS.
C
      READ (60,60) DEPTH
   60 FORMAT (8F10.2)
C
C     DETERMINE THE NUMBER OF STANDARD DEPTH VALUES.
C
      KDM = 1
      DO 10 I=2,24
      IF (DEPTH(I).EQ.0.0) GO TO 20
      KDM = KDM+1
   10 CONTINUE
   20 IF (KDM.GT.20) STOP 222
      WRITE(61,170)KDM,(DEPTH(I),I=1,KDM)
  170 FORMAT(1H0,I2,* STANDARD DEPTHS: *,3(/1H ,20X,8F10.2))
C
C     CHECK FOR THE ARRAY LIMITS.
C
      IF (IZONES.GT.25) WRITE (61,70)
   70 FORMAT (/2X,34HNUMBER OF ZONES IS GREATER THAN 25)
      IF (IZONES.GT.25) STOP 04
      IF (IROW.GT.300) WRITE (61,80)
   80 FORMAT (/2X,46HROW BATHYMETRY DIMENSIONS ARE GREATER THAN 300)
      IF (IROW.GT.300) STOP 03
      IF(NUMPAR.GT.50)NUMPAR = 50
      IF (NUMPAR.LE.0) STOP05
C
C  READ IN THE DESIRED CRUISE REFERENCE NUMBER.
C
      READ (60,90) ICRN,IYR
   90 FORMAT (A7,T1,I2)
      WRITE(61,100) ICRN
  100 FORMAT(0H0CRUISE ,A7)
C
C  RETRIEVE THE CODES FOR THE DESIRED YEAR
C
      CALL LIBRARY(IYR)
C
C     READ IN THE PARAMETER CODES TO BE EXAMINED.
C  IF EBT VALUES ARE WANTED, ONLY ONE CODE MUST BE READ IN, AND
C  IT MUST BE A TEMPERATURE CODE (100 OR 104)
C  IF CODE 104 WAS SPECIFIED FOR A CRUISE BEFORE 1972, IT IS CHANGED
C  TO CODE 100.
C
      READ (60,100) (INCODE(I),I=1,NUMPAR)
  100 FORMAT (20I4)
      WRITE(61,190)(INCODE(I),I=1,NUMPAR)
  190 FORMAT(1H0,*PARAMETER CODES:*,2(25I4,/))
      DO 23 I=1,NUMPAR
      IF (INCODE(I).EQ.104.AND.IYR.LT.72) PRINT 24
   24 FORMAT(1H0,*NOTE - CODE 100 IS USED INSTEAD OF CODE 104*,
     1  * SINCE 104 WAS NOT MEASURED BEFORE 1972*)
      IF (INCODE(I).EQ.104.AND.IYR.LT.72) INCODE(I)=100
   23 CONTINUE
C
C  IPOS(PARAMETER CODE) = CODE COUNTER
C
      CALL ZEROV(IPOS,1000)
      DO 2 I=1,NUMPAR
      L=INCODE(I)
      IPOS(L)=I
      CALL CON1(INCODE(I))
    2 CONTINUE
C
C  READ ZONES AND DEPTHS FOR SUMMARY REPORT
C
      READ (60,100) I17,(IDZ17(J),J=1,5)
      IF (EOF(60).NE.0) GO TO 49
      DO 110 J=1,5
      JJ=5-J+1
      IF (IDZ17(JJ).NE.0) GO TO 111
  110 CONTINUE
  111 WRITE(61,200) I17,(IDZ17(J),J=1,JJ)
      READ (60,100) I25,(IDZ25(J),J=1,5)
      IF (EOF(60).NE.0) GO TO 49
```

```
                      IF (I25.NE.25) GO TO 49
                      DO 112 J=1,5
                      JJ=5-J+1
235                   IF (IDZ25(JJ).NE.0) GO TO 113
               112    CONTINUE
               113    WRITE(61,200) I25,(IDZ25(J),J=1,JJ)
               200    FORMAT(1H0,*DEPTH NUMBERS FOR ZONE*,I3,* IN SUMMARY REPORT ARE *,
                     1   5I3)
240            49     CONTINUE
                      C
                      C  LOCATE ALL THE STATIONS FOR THE CRUISE
                      C
                      CPL    LOCATE STAT WHERE C1 EQ ICRN.
245                   S2KDU1=10
                      S2KDU2=0
                      CALL S2KPL6(S2KDUM, DBNAM, STAT, S2R1, CRUISE(7), ICRN)
                      NS=IDATAS
                      IF (NS.NE.0) GO TO 53
250                   WRITE(61,54) ICRN
               54     FORMAT(1H0,*CRUISE *,A7,* NOT FOUND*)
                      STOP54
               53     CONTINUE
                      C
255                   C      SET CONSTANTS FOR THE SPECIFIED LAKE.
                      C
                            CALL SELECT (LAKE,PHIM,GM,A,B)
                      C
                      C  READ IN THE BATHYMETRY DATA AND DETERMINE THE ZONES FOR EACH
260                   C  CELL IN THE LAKE
                      C
                            CALL BATHY
                      C
                      C
265                   C  RETRIEVE ONE STATION AT A TIME
                      C
                            LIN=0
                            DO 11 I=1,NS
                      CPL   GET STAT NEXT.
270                         S2KDU1=24
                            S2KDU2=0
                            CALL S2KPL4(S2KDUM, DBNAM, STAT, S2KDU6, S2KDU7)
                            IF (IRTNCD.EQ.4) GO TO 16
                            IF (IRTNCD.EQ.0) GO TO 55
275                         WRITE(61,56) IRTNCD
               56           FORMAT(1H0,*ERROR ON GET STAT, IRTNCD = *,I5)
                            STOP56
               55           CONTINUE
                            C
280                         IF (I.NE.1) GO TO 103
                      CPL   GETA CRUISE.
                            S2KDU1=40
                            S2KDU2=0
                            CALL S2KPL4(S2KDUM, DBNAM, CRUISE, S2KDU6, S2KDU7)
285                         ID1=C7
                            ID2=C0
                            IF (IRTNCD.NE.0) WRITE(61,102) IRTNCD
               102          FORMAT(1H ,*ERROR ON GETA CRUISE, IRTNCD = *,I5)
                            IF (IRTNCD.NE.0) GO TO 1999
290            103          LIN=LIN+1
                            C
                            C  CHANGE DDDMMSS OF LATITUDE AND LONGITUDE TO DD.MMSS
                            C
                            LAT=C51/10000.
295                         MIN=(C51-LAT*10000.)/100.
                            ISEC=MOD(C51,100)
                            XLAT=LAT+MIN/60.+ISEC/3600.
                            LONG=C52/10000.
                            MIN=(C52-LONG*10000.)/100.
300                         ISEC=MOD(C52,100)
                            XLONG=LONG+MIN/60.+ISEC/3600.
                      C
                            G = GM-XLONG
                            P = XLAT-PHIM
305                         XSTIN = G*A(1)+P*A(2)+P*G*A(3)+(G**2)*A(4)+(P**2)*A(5)
                            YSTIN = G*B(1)+P*B(2)+P*G*B(3)+(G**2)*B(4)+(P**2)*B(5)
                      C
                            IS=(XSTIN+DLAT/2.)/DLAT
```

```
                JS=(YSTIN+DLAT/2.)/DLAT
      C
      CC  DO NOT COLLECT STATIONS IN THE ELIMINATED ZONES
      C
                REWIND 35
                DO 186 JJ=1,JS
                READ (35) (NO(II),II=1,IROW)
      186       CONTINUE
                IF (NO(IS).NE.0) GO TO 187
                LIN=LIN-1
                GO TO 11
      C
      187       XSTAT(LIN)=XSTIN
                YSTAT(LIN)=YSTIN
                PERM=C59
                ACTST(LIN)=PERM
                CALL ZEROV(T,9)
                CALL ZEROV(Z,9)
                DO 3 J=1,51
                DO 3 JJ=1,25
                PAR(JJ,J)=-1.0
      3         CONTINUE
      C
      CC  RETRIEVE BT DATA WHEN IT EXISTS FOR THE STATION
      C
                IF (NUMPAR.GT.1) GO TO 14
                IC=INCODE(1)
                IF (ICODE(IC).NE.180.AND.ICODE(IC).NE.184) GO TO 14
                BTYPE=C63
                IF (C63.EQ.4H-NUL) GO TO 14
                DO 12 J=1,9
      CPL       GETD BTS NEXT.
                S2KDU1=34
                S2KDU2=0
                CALL S2KPL4(S2KDUM, DBNAM, BTS, S2KDU6, S2KDU7)
                T(J)=C81
                Z(J)=C82
      12        CONTINUE
      14        CONTINUE
      C
      CC  GET THE NEXT DEPTH AND PARAMETER RECORD
      C
      CPL       GETD DEPPAR NEXT.
                S2KDU1=34
                S2KDU2=0
                CALL S2KPL4(S2KDUM, DBNAM, DEPPAR, S2KDU6, S2KDU7)
                IF (IRTNCD.EQ.4) GO TO 13
                DECODE(3,185,C182) NCODE
      185       FORMAT(I3)
                ICD=IPOS(NCODE)
                IF (ICD.EQ.0) GO TO 14
                ICD=ICD+1
                DEPS=C181
      C
      CC  PAR(DEPTH NO.,1) = DEPTH IN METRES
      CC  PAR(DEPTH NO.,PARAMETER CODE COUNTER+1) = PARAMETER VALUE
      C
                DO 17 J=1,25
                IF (PAR(J,1).EQ.-1.0) PAR(J,1)=DEPS
                IF (PAR(J,1).EQ.DEPS) GO TO 18
      17        CONTINUE
      18        PAR(J,ICD)=C184
                GO TO 14
      13        CONTINUE
      C
      CC
      CC  IF EBTS WERE REQUESTED, THE VALUES ARE TRANSFERRED TO THE ARRAY PAR.
      CC  IF THE EBTS ARE NOT AVAILABLE, THE DEPTH AND TEMPERATURE
      CC  VALUES FOR THE STATION ARE USED.
      C
                NP1=NUMPAR+1
                IF (NUMPAR.GT.1) GO TO 26
                IC=INCODE(1)
                IF (ICODE(IC).NE.180.AND.ICODE(IC).NE.184) GO TO 26
                IF (BTYPE.EQ.4H-NUL) GO TO 26
      C
                DO 28 J=1,25
```

```
                      IF (J.LE.9) PAR(J,1)=Z(J)
                      IF (J.LE.9) PAR(J,2)=T(J)
                      IF (J.GT.9.OR.(PAR(J,1).EQ.0.0.AND.PAR(J,2).EQ.0.0)) PAR(J,1)=-1.0
                      IF (J.GT.9.OR.(PAR(J,1).EQ.-1.0.AND.PAR(J,2).EQ.0.0))PAR(J,2)=-1.0
  390           28    CONTINUE
                C
                C  WRITE THE PERMANENT STATION NUMBER AND
                C  PARAMETER VALUES FOR ONE STATION ONTO A SCRATCH FILE
                C
  395           26    WRITE(1) PERM,((PAR(J,K),J=1,25),K=1,NP1)
                C
                11    CONTINUE
                C
                C  ALL DATA FOR THIS RUN HAS BEEN ACCUMULATED
                C
  400
                16    ENDFILE 1
                C
                C  NOW PROCESS EACH PARAMETER
                C
  405           DO 19 I=1,NUMPAR
                      REWIND 1
                      REWIND 2
                      IC=INCODE(I)
                      IF (NUMPAR.GT.1) GO TO 22
  410                 IF (ICODE(IC).NE.100.AND.ICODE(IC).NE.104) GO TO 22
                      IC=1
                      IFAC(IC)=0
                      ICODE(IC)=0
                      ABRS(IC)=3HEBT
  415           22    WRITE(61,114) ABRS(IC),ICODE(IC)
                114   FORMAT(1H1,*PARAMETER *,A4,2H (,I4,1H))
                      IF(IFAC(IC).NE.99)WRITE (61,130) (DEPTH(L),L=1,KDM)
                 130  FORMAT (1H0,*STANDARD DEPTHS:*,/1H0,5X,20F6.0/)
                      IF(IFAC(IC).EQ.99) WRITE(61,135)(DEPTH(L),L=1,KDM)
  420           135   FORMAT(1H0,*STANDARD DEPTHS:*,/1H0,5X,15F8.0,/6X,5F8.0/)
                C
                C     REWIND FILE NUMBER 35 WHICH CONTAINS THE ZONE NUMBER ASSOCIATED
                C     WITH EACH CELL IN THE LAKE AND FILE NUMBER 36 WHICH CONTAINS
                C     THE STATION NUMBER ASSOCIATED WITH EACH CELL.
  425           C
                      REWIND 35
                      REWIND 36
                C
                C  PRODUCE A REPORT OF INTERPOLATED VALUES FOR EACH PARAMETER
  430           C
                      CALL REPORT(I,NUMPAR)
                C
                C     CALCULATE VOLUME WEIGHTED AVERAGES FOR EACH LAYER AND ZONE.
                C
  435                 CALL FILL
                      IF(LIN.GT.8) CALL INTEGRT (IC)
                      WRITE (61,140)
                 140  FORMAT (1H1)
                      CALL SUMRY(ABRS(IC),ICODE(IC),LAKE,IYR,ID1,ID2,ICRN)
  440           19    CONTINUE
                C
                1999  CONTINUE
                C  CLOSE THE S2K FILE
                CPL   CLOSE DBNAM.
  445                 S2KDU1=97
                      CALL S2KPL2(S2KDUM, DBNAM)
                999   CONTINUE
                CPL   STOP S2K.
                      S2KDU1=92
  450                 CALL S2KPL1(S2KDUM)
                      STOP
                C
                      END
```

SYMBOLIC REFERENCE MAP (R=1)

ENTRY POINTS
10134 ALDAR

VARIABLES	SN	TYPE	RELOCATION	
13704	A	REAL	ARRAY	
10233	ACTST	REAL	ARRAY	STAT
0	BTS	INTEGER	ARRAY	BTS
0	CRUISE	INTEGER	ARRAY	CRUISE
30	C101	REAL		DEPPAR
32	C104	REAL		DEPPAR
13176	C52	INTEGER		STAT
13200	C63	REAL		STAT
32	C8	INTEGER		CRUISE
23	C82	REAL		BTS
0	DEPPAR	INTEGER	ARRAY	DEPPAR
1	DEPTH	REAL	ARRAY	IN
621	DLAT	REAL		VARS
11652	GM	REAL		
11673	IC	INTEGER		
0	ICODE	INTEGER	ARRAY	CON
0	ICRN	INTEGER		STAT
15	IDATAP	INTEGER		DBNAM
20	IDATE	INTEGER		DBNAM
50	IDZ25	INTEGER	ARRAY	SUM
11654	ID2	INTEGER		
536	IFAC	INTEGER	ARRAY	CON
1	INCODE	INTEGER	ARRAY	STAT
11636	IPACKN	INTEGER		
11702	IPOS	INTEGER	ARRAY	
10	IRTNCD	INTEGER		DBNAM
5	ISCHME	INTEGER	ARRAY	DBNAM
22	ISEPSV	INTEGER		DBNAM
17	ITIME	INTEGER		DBNAM
11637	IUSER	INTEGER		
456	IZBO	INTEGER	ARRAY	MAP
56	I17	INTEGER		SUM
11646	J	INTEGER		
11670	JS	INTEGER		
0	KDM	INTEGER		IN
11645	L	INTEGER		
12	LASTS	INTEGER		DBNAM
16	LEVEWL	INTEGER		DBNAM
11661	LONG	INTEGER		
11642	N	INTEGER		
11675	NCODE	INTEGER		
0	NO	INTEGER	ARRAY	MAP
31	NOUT	INTEGER		IN
11650	NS	INTEGER		
11640	NUMPAR	INTEGER		
10544	PAR	REAL	ARRAY	STAT
11651	PHIM	REAL		
13137	STAT	INTEGER	ARRAY	STAT
0	S2KDUM	INTEGER	ARRAY	S2KDUM
26	S2KDU11	INTEGER		S2KDUM
4	S2KDU3	INTEGER		S2KDUM
15	S2KDU5	INTEGER		S2KDUM
17	S2KDU7	INTEGER		S2KDUM
24	S2KDU9	INTEGER		S2KDUM
1	S2KRTC	INTEGER		S2KDUM
13716	S2R1	INTEGER	ARRAY	
63	TH	REAL	ARRAY	STAT
11660	XLAT	REAL		
0	XSTAT	REAL	ARRAY	VARS
310	YSTAT	REAL	ARRAY	VARS
13673	Z	REAL	ARRAY	
36	Z25	REAL	ARRAY	SUM
1274	ABRS	REAL	ARRAY	CON
13711	B	REAL	ARRAY	
11674	BTYPE	REAL		
30	C1	REAL		CRUISE
31	C102	REAL		DEPPAR
13175	C51	INTEGER		STAT
13177	C59	REAL		STAT
31	C7	INTEGER		CRUISE
22	CB1	REAL		BTS
0	DBNAM	INTEGER	ARRAY	DBNAM
11677	DEPS	REAL		
11	DFILL	INTEGER		DBNAM
11663	G	REAL		
11641	I	INTEGER		
11676	ICD	INTEGER		
455	ICOLMN	INTEGER		MAP
21	ICYCLE	INTEGER		DBNAM
14	IDATAS	INTEGER		DBNAM
43	IDZ17	INTEGER	ARRAY	SUM
11653	ID1	INTEGER		
23	IENT	INTEGER		DBNAM
11671	II	INTEGER		
11635	IPACKF	INTEGER		
13	IPASSWD	INTEGER		DBNAM
454	IROW	INTEGER		MAP
11667	IS	INTEGER		
11657	ISEC	INTEGER		
24	ISTA	INTEGER		DBNAM
13652	ITITLE	INTEGER	ARRAY	
11644	IYR	INTEGER		
56	IZONES	INTEGER		IN
57	I25	INTEGER		SUM
11647	JJ	INTEGER		
11701	K	INTEGER		
32	KOUT	INTEGER	ARRAY	IN *
11643	LAKE	INTEGER		
11655	LAT	INTEGER		
620	LIN	INTEGER		VARS
11656	MIN	INTEGER		
10543	NACT	INTEGER		STAT
1132	NHYP	INTEGER	ARRAY	MAP
2032	NOSCODE	INTEGER		CON
11700	NP1	INTEGER		
7723	NSTP	INTEGER	ARRAY	STAT
11664	P	REAL		
11672	PERM	REAL		
55	QUANT	REAL		SUM
2	S2KCNT	INTEGER		S2KDUM
0	S2KDU1	INTEGER		S2KDUM
3	S2KDU2	INTEGER		S2KDUM
6	S2KDU4	INTEGER		S2KDUM
16	S2KDU6	INTEGER		S2KDUM
23	S2KDU8	INTEGER		S2KDUM
31	S2KLKH	INTEGER	ARRAY	S2KDUM
25	S2KSRT	INTEGER		S2KDUM
13662	T	REAL	ARRAY	
0	WAREA	REAL	ARRAY	SUM
11662	XLONG	REAL		
11665	XSTIN	REAL		
11666	YSTIN	REAL		
31	Z17	REAL	ARRAY	SUM

FILE NAMES	MODE								
0 INPUT		154	OUTPUT	FMT	330	TAPE1	UNFMT	2460	TAPE10
1404 TAPE2		3534	TAPE30	UNFMT	5610	TAPE35	UNFMT	6664	TAPE36
7740 TAPE4		0	TAPE60	FMT	154	TAPE61	FMT		

EXTERNALS	TYPE	ARGS			
ATTS2K		4	BATHY		0
CON1		1	EOF	REAL	1
FILL		0	INTEGRT		1
LIBRARY		1	REPORT		2

EXTERNALS TYPE ARGS

SELECT	5	SUMRY	7
S2KPL1	1	S2KPL2	2
S2KPL4	5	S2KPL6	6
USERDBX	1	ZEROV	2

INLINE FUNCTIONS TYPE ARGS

MOD	INTEGER	2 INTRIN

STATEMENT LABELS

0	2		0	3		11156	5		FMT
10160	6		11165	7	FMT	10164	8		
11177	9	FMT	0	10		10716	11		
0	12		10646	13		10613	14		
10721	16		0	17		10642	18		
0	19		10222	20		10743	22		
0	23		11422	24	FMT	10710	26		
0	28		11143	40	FMT	10400	49		
11213	50	FMT	11264	51	FMT	10411	53		
11477	54	FMT	10427	55		11510	56		FMT
113``	60	FMT	11340	70	FMT	11351	80		FMT
113e6	90	FMT	11404	100	FMT	11521	102		FMT
10442	103		11541	105	FMT	0	106		
10542	107		0	110		10358	111		
0	112		10373	113		11557	114		FMT
11570	130	FMT	11601	135	FMT	11614	140		FMT
11221	150	FMT	11234	151	FMT	11247	152		FMT
11273	160	FMT	11327	170	FMT	11374	180		FMT
11412	190	FMT	11463	200	FMT	11017	999		
11014	1999								

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES		
10215	10	I	165 168	5B	OPT	EXITS	
10302	23	I	205 218	17B		EXT REFS	
10324	2	I	215 219	10B		EXT REFS	
10342	110	J	225 228	6B	OPT	EXITS	
10365	112	J	233 236	6B	OPT	EXITS	
10416	11	I	260 397	303B		EXT REFS	EXITS NOT INNER
10526	106	JJ	314 316	10B		EXT REFS	
10554	3	J	327 330	13B		NOT INNER	
10561	9	JJ	328 330	2B	OPT		
10602	12	J	339 346	11B		EXT REFS	
10631	17	J	366 369	11B	OPT	EXITS	
10664	20	J	385 390	23B	OPT		
10724	19	I	405 448	70B		EXT REFS	

COMMON BLOCKS LENGTH

STAT	5761
IN	47
MAP	1102
VARS	402
CON	1051
SUM	48
DBNAM	21
CRUISE	27
DEPPAR	27
BTS	28
S2KDUM	35

STATISTICS

PROGRAM LENGTH	4525B	2389
BUFFER LENGTH	7211B	3721
CM LABELED COMMON LENGTH	20535B	8541
52000B CM USED		

```
      1              SUBROUTINE LIBRARY (KYR)
                     COMMON/CON/ICODE(350),IFAC(350),ABRS(350),NOSCODE
                C
                C--  THIS SUBROUTINE RETRIEVES THE CORRECT SET OF CODES, NUMBER
      5         C--  OF DECIMAL PLACES, AND ABBREVIATED NAMES FOR THE YEAR.
                C
                     REWIND 10
                  2  READ(10) IYR,NOSCODE,(ICODE(I),IFAC(I),ABRS(I),I=1,NOSCODE)
                     IF(EOF(10).NE.0) GO TO 1
     10              IF(IYR.NE.KYR) GO TO 2
                     RETURN
                  1  WRITE(61,10) KYR
                 10  FORMAT(10X,21HERROR ON LIBRARY CARD/10X,7HYEAR 19,I2,20H IS NOT A
                    1VALID YEAR)
     15              STOP
                     END
```

SYMBOLIC REFERENCE MAP (R=1)

```
ENTRY POINTS
    3  LIBRARY

VARIABLES     SN  TYPE           RELOCATION
 1274  ABRS      REAL      ARRAY    CON          71  I         INTEGER
    0  ICODE     INTEGER   ARRAY    CON         536  IFAC      INTEGER    ARRAY    CON
   70  IYR       INTEGER                          0  KYR       INTEGER             F.P.
 2032  NOSCODE   INTEGER            CON

FILE NAMES       MODE
      TAPE10     UNFMT              TAPE61    FMT

EXTERNALS          TYPE   ARGS
      EOF        REAL      1

STATEMENT LABELS
   32  1                                  7  2                                  56  10      FMT

LOOPS  LABEL    INDEX     FROM-TO    LENGTH    PROPERTIES
   12           I           0 0        12B              EXT REFS

COMMON BLOCKS   LENGTH
      CON         1051

STATISTICS
  PROGRAM LENGTH                    72B      58
  CM LABELED COMMON LENGTH        2033B    1051
        52000B CM USED
```

```
      1              SUBROUTINE CON1 (IC)
                     C
                     C     SEARCHES THE ARRAY ICODE OF LENGTH NOSCODE FOR THE INTEGER IC.
                     C     THE ELEMENTS OF ICODE ARE ASSUMED TO BE IN ASCENDING ORDER.
      5              C     IC IS INPUT AS THE CODE, AND OUTPUT AS THE INDEX IN -ICODE- WHERE
                     C     IT IS.
                     C
                           COMMON/CON/ ICODE(350),IFAC(350),ABRS(350),NOSCODE
                     C--   SET LIMITS OF ARRAY
     10                    LO=1
                           NHI=NOSCODE
                     C--   FIND MIDDLE OF ARRAY
                       2   MID=(NHI+LO)/2
                     C--   HAVE WE FOUND THE CORRECT CODE
     15                    IF(IC.EQ.ICODE(MID)) GO TO 100
                     C--   ERROR EXIT
                           IF(NHI.LE.LO) GO TO 200
                     C--   CHECK WHICH HALF OF ARRAY CODE IS IN
                           IF(IC.LT.ICODE(MID)) GO TO 130
     20                    LO=MID+1
                           GO TO 2
                     130   NHI=MID-1
                           GO TO 2
                     100   IC=MID
     25                    RETURN
                     200   WRITE(61,210) IC
                     210   FORMAT(1X,*COULD NOT FIND CODE *,I3,* IN CODES TABLE*)
                           STOP
                           END
```

SYMBOLIC REFERENCE MAP (R=1)

ENTRY POINTS
3 CON1

VARIABLES SN TYPE RELOCATION

1274	ABRS	REAL	ARRAY	CON	0	IC	INTEGER		F.P.
3	ICODE	INTEGER	ARRAY	CON	536	IFAC	INTEGER	ARRAY	CON
43	LO	INTEGER			45	MID	INTEGER		
44	NHI	INTEGER			2032	NOSCODE	INTEGER		CON

FILE NAMES MODE
TAPE61 FMT

STATEMENT LABELS

10	2	23	100			20	130		
25	200	34	210	FMT					

COMMON BLOCKS LENGTH
CON 1051

STATISTICS
PROGRAM LENGTH 46B 38
CM LABELED COMMON LENGTH 2033B 1051
52000B CM USED

```
      SUBROUTINE SELECT (LAKE,PHIM,GM,A,B)
C
C     THIS PROGRAM SELECTS THE DESIRED LAKE AND SETS THE CONSTANTS
C     RELATED TO THAT LAKE.
C
      DIMENSION A(5),B(5)
      COMMON /VARS/ XSTAT(200),YSTAT(200),LIN,DLAT
C
      IF (LAKE.LT.0.OR.LAKE.GT.5) GO TO 60
      LAKE = LAKE+1
      GO TO (10,20,30,40,60,50), LAKE
C
C     LAKE ONTARIO
C     2 KM. GRID SIZE
C
   10 PHIM = 43.1643
      GM = 79.82
      A(1) = 81.3221
      A(2) = 2.4294
      A(3) = -1.3349
      B(1) = -1.7669
      B(2) = 111.1010
      B(4) = 0.4054
      WRITE (61,70)
      RETURN
C
C     LAKE ERIE
C     2 KM. GRID SIZE
C
   20 PHIM = 48.9700
      GM = 82.9035
      A(1) = 74.0161
      A(2) = 52.9979
      A(3) = -1.1525
      A(4) = 0.2210
      B(1) = -40.1422
      B(2) = 97.6373
      B(3) = 0.5957
      B(4) = 0.4291
      WRITE (61,80)
      RETURN
C
C     LAKE HURON
C     4 KM. GRID SIZE
C
   30 IF(DLAT.EQ.2.0) GO TO 32
      PHIM = 42.9266
      GM = 84.0560
      A(1) = 81.6400
      A(2) = 2.0300
      A(3) = -1.3471
      B(1) = -2.0451
      B(2) = 111.1110
      B(4) = 0.4054
      WRITE (61,90)
      RETURN
C     2 KM. GRID SIZE
   32 PHIM=42.9661
      GM=84.6621
      A(1)=81.5869
      A(2)=2.5757
      A(3)=-1.3471
      B(1)=-1.8561
      B(2)=111.1110
      B(4)=0.4054
      WRITE(61,91)
      RETURN
C
C     LAKE SUPERIOR
C     4 KM. GRID SIZE
C
   40 IF(DLAT.EQ.2.0) GO TO 42
      IF(DLAT.EQ.8.0) GO TO 48
      PHIM = 46.2826
      GM = 92.1000
      A(1) = 77.0726
      A(2) = 5.0423
```

```
                      A(3) = -1.4249
                      B(1) = -3.9063
      60              B(2) = 111.1760
                      B(4) = 0.486127
                      WRITE (61,100)
                      RETURN
                C     2 KM. GRID SIZE
      65         42   PHIM=46.3185
                      GM=92.1020
                      A(1)=77.0215
                      A(2)=5.0462
                      A(3)=-1.4249
      90              B(1)=-3.9089
                      B(2)=111.1760
                      B(4)=.4861
                      WRITE(61,102)
                      RETURN
      95        C     8 KM GRID SIZE
                48    PHIM=46.2311
                      GM=92.5109
                      A(1)=77.1459
                      A(2)=6.4270
     100              A(3)=-1.4249
                      B(1)=-4.3050
                      B(2)=111.1760
                      B(4)=0.4861
                      WRITE(61,108)
     105              RETURN
                C
                CC    GEORGIAN BAY
                C
                58    PHIM=44.4752
     110              GM=82.3226
                      A(1)=79.5539
                      A(2)=-0.5757
                      A(3) = -1.3471
                      B(1)=0.4149
     115              B(2) = 111.1118
                      B(4) = 0.4854
                      WRITE (61,110)
                      RETURN
                C
     120        68    WRITE (61,120)
                      STOP 416
                C
                CC
                C
     125        70    FORMAT(/10X,*LAKE ONTARIO(2KM.) IS BEING STUDIED*)
                80    FORMAT(/10X,*LAKE ERIE(2KM.) IS BEING STUDIED*)
                90    FORMAT(/10X,*LAKE HURON(4KM.) IS BEING STUDIED*)
                91    FORMAT(/10X,*LAKE HURON(2KM.) IS BEING STUDIED*)
                100   FORMAT(/10X,*LAKE SUPERIOR(4KM.) IS BEING STUDIED*)
     130        102   FORMAT(/10X,*LAKE SUPERIOR(2KM.) IS BEING STUDIED*)
                108   FORMAT(/10X,*LAKE SUPERIOR(8KM.) IS BEING STUDIED*)
                110   FORMAT(/10X,*GEORGIAN BAY(2KM.) IS BEING STUDIED*)
                120   FORMAT(/2X,*ERROR IN LAKE CODE*)
                      END
```

SYMBOLIC REFERENCE MAP (R=1)

ENTRY POINTS
3 SELECT

VARIABLES	SN	TYPE	RELOCATION		VARIABLES	SN	TYPE	RELOCATION	
0	A	REAL	ARRAY	F.P.	0	B	REAL	ARRAY	F.P.
621	DLAT	REAL		VARS	0	GM	REAL		F.P.
0	LAKE	INTEGER		F.P.	620	LIN	INTEGER		VARS
0	PHIM	REAL		F.P.	0	XSTAT	REAL	ARRAY	VARS
310	YSTAT	REAL	ARRAY	VARS					

FILE NAMES	MODE
TAPE61	FMT

STATEMENT LABELS

23	10			44	20			67	30		
112	32			133	40			157	42		
200	40			221	50			242	60		
300	70	FMT		306	80	FMT		314	90	FMT	
322	91	FMT		330	100	FMT		336	102	FMT	
344	100	FMT		352	110	FMT		360	120	FMT	

COMMON BLOCKS LENGTH
VARS 402

STATISTICS

PROGRAM LENGTH	472B	314
CM LABELED COMMON LENGTH	622B	402

52000B CM USED

```
      1                 SUBROUTINE BATHY
                C
                C       THIS S/R READS IN THE BATHYMETRY AND SETS THE ZONE AND MEAN
                C       DEPTH FOR EACH CELL IN THE LAKE.
      5         C
                      COMMON /MAP/ NO(300),IROW,ICOLMN,IZBO(300),NHYP(20,25)
                      COMMON /IN/ KDM,DEPTH(24),NOUT,KOUT(20),IZONES
                C
                      CALL ZEROU (NHYP,500)
     10         C
                C       READ IN THE BATHYMETRY DATA FROM DISC.
                C
                      DO 40 I=1,ICOLMN
                      READ (30) (IZBO(N),N=1,IROW)
     15               DO 30 J=1,IROW
                C
                C       SET THE MEAN DEPTH FOR EACH CELL.
                C
                      IXBO = MOD(IZBO(J),1000)
     20               IF (IXBO.NE.0) GO TO 10
                      NO(J) = 0
                      GO TO 30
                   10 ZW = FLOAT(IXBO)
                C
     25         C       DETERMINE THE ZONE FOR EACH CELL.
                C
                      NC = IZBO(J)/1000
                      NO(J) = NC
                C
     30         C       RESET THOSE CELLS WHICH ARE FOUND IN THE EXCLUDED ZONES TO ZERO.
                C
                      IF(NOUT.EQ.0) GO TO 11
                      DO 12 L=1,NOUT
                      IF(NC.EQ.KOUT(L)) NO(J)=0
     35               IF(NC.EQ.KOUT(L)) GO TO 30
                   12 CONTINUE
                C
                C  NHYP(STANDARD DEPTH NO.,ZONE NO.) = TOTAL NUMBER OF GRID CELLS AT
                C                                       EACH STANDARD DEPTH IN EACH ZONE
     40         C  ZONE 25 = WHOLE LAKE
                C
                   11 DO 20 KD=1,KDM
                      IF (ZW.LT.DEPTH(KD)) GO TO 30
                      NHYP(KD,NC) = NHYP(KD,NC)+1
     45               NHYP(KD,25) = NHYP(KD,25)+1
                   20 CONTINUE
                   30 CONTINUE
                C
                C       WRITE THE ZONES FOR EACH CELL IN THE LAKE ONTO A SCRATCH FILE.
     50         C
                      WRITE (35) (NO(L),L=1,IROW)
                   40 CONTINUE
                      END FILE 35
                      RETURN
     55               END
```

SYMBOLIC REFERENCE MAP (R=1)

ENTRY POINTS
1 BATHY

VARIABLES	SN	TYPE		RELOCATION						
1	DEPTH	REAL	ARRAY	IN	107	I	INTEGER			
455	ICOLMN	INTEGER		MAP	454	IROW	INTEGER			MAP
112	IXBO	INTEGER			456	IZBO	INTEGER	ARRAY		MAP
56	IZONES	INTEGER		IN	111	J	INTEGER			
116	KD	INTEGER			0	KDM	INTEGER			IN
32	KOUT	INTEGER	ARRAY	IN	115	L	INTEGER			
110	N	INTEGER			114	NC	INTEGER			
1132	NHYP	INTEGER	ARRAY	MAP	0	NO	INTEGER	ARRAY		MAP
31	NOUT	INTEGER		IN	113	ZW	REAL			

```
FILE NAMES          MODE
     TAPE30         UNFMT                    TAPE35    UNFMT

EXTERNALS           TYPE    ARGS
     ZEROV                    2

INLINE FUNCTIONS    TYPE    ARGS
     FLOAT          REAL       1  INTRIN                    MOD        INTEGER    2  INTRIN

STATEMENT LABELS
    21  10                                      42  11                                  0  12
     0  20                                      55  30                                  0  40

LOOPS  LABEL    INDEX      FROM-TO     LENGTH     PROPERTIES
     5  40      I            13 52        63B              EXT REFS  NOT INNER
    13  30      J            15 47        45B              NOT INNER
    31  12      L            33 36        11B         OPT    EXITS
    43  20      KD           42 46        12B         OPT    EXITS

COMMON BLOCKS    LENGTH
     MAP            1102
     IN               47

STATISTICS
  PROGRAM LENGTH                        117B        79
  CM LABELED COMMON LENGTH             2175B      1149
          52600B CM USED
```

```
52    1                 SUBROUTINE REPORT(IP,NUMPAR)
                  C
                        DIMENSION IVAR(3)
                        COMMON /CON/ ICODE(350),IFAC(350),ABRS(350),NOSCODE
      5                 COMMON /STAT/ ICRN,INCODE(50),TH(20,200),NSTP(200),ACTST(200),
                       1              NACT,PAR(25,51)
                  C
                  CC    TH(STANDARD DEPTH,PSN)=INTERPOLATED PARAMETER VALUE
                  C
     10                 DO 10 L=1,20
                        DO 10 M=1,200
                        TH(L,M)=-1.0
                  10    CONTINUE
                        NP1=NUMPAR+1
     15                 WRITE(61,11)
                  11    FORMAT(* PSN*)
                        IN=0
                        INP=0
                        CALL ZEROV(NSTP,200)
     20           C
                  CC    READ THE INFORMATION FOR EACH STATION FROM THE SCRATCH FILE
                  C
                  9     READ(1) PERM,((PAR(J,K),J=1,25),K=1,NP1)
                        IF (EOF(1).NE.0) GO TO 12
     25           C
                  CC    INTERPOLATE THE PARAMETER VALUES TO THE STANDARD DEPTHS
                  C
                        INP=INP+1
                        IN=IN+1
     30                 CALL INTRPOL(IP,IN,NK)
                  C
                  CC    NSTP IS A LIST OF STATIONS (ACTUALLY COUNTERS FOR THE ORIGINAL LIST
                  CC    OF STATIONS) THAT HAVE DATA FOR THIS PARAMETER CODE.
                  C
     35                 IF (NK.GT.0) NSTP(IN)=INP
                  C
                  CC    PRINT OUT THE INTERPOLATED VALUES FOR ONE PARAMETER
                  C
                        IF (NUMPAR.GT.1) GO TO 50
     40                 IC=INCODE(1)
                        IF (ICODE(IC).NE.100.AND.ICODE(IC).NE.104) GO TO 50
                        IF (NK.GT.0) WRITE(61,55) PERM,(TH(K,IN),K=1,NK)
                  55    FORMAT(1X,A3,2X,20(1X,F5.2))
                        GO TO 9
     45           50    IC=INCODE(IP)
                        IF(IFAC(IC).EQ.99) GO TO 70
                        ENCODE(30,60,IVAR(1)) IFAC(IC)
                  60    FORMAT(19H(1X,A3,2X,20(1X,F5.,I1,2H)),0X)
                        IF (NK.GT.0) WRITE(61,IVAR) PERM,(TH(K,IN),K=1,NK)
     50                 GO TO 9
                  70    IF(NK.GT.0) WRITE(61,75)PERM,(TH(K,IN),K=1,NK)
                  75    FORMAT(1X,A3,2X,15(1X,E7.2),/6X,5(1X,E7.2))
                        GO TO 9
     55           C
                  CC    FILE NUMBER 2 CONTAINS THE ACTUAL OBSERVATIONS AND THEIR DEPTHS
                  C     AT EACH STATION (FOR ONE PARAMETER ONLY)
                  C
                  12    ENDFILE 2
                        REWIND 2
     60                 RETURN
                        END
```

CARD NR. SEVERITY DETAILS DIAGNOSIS OF PROBLEM

```
52    I     32 CD 52  FIELD WIDTH OF A CONVERSION DESCRIPTOR SHOULD BE AS LARGE AS THE MINIMUM SPECIFIED FOR THAT DESCRIPTOR.
52    I     47 CD 52  FIELD WIDTH OF A CONVERSION DESCRIPTOR SHOULD BE AS LARGE AS THE MINIMUM SPECIFIED FOR THAT DESCRIPTOR.
```

SYMBOLIC REFERENCE MAP (R=1)

```
ENTRY POINTS
     3  REPORT

VARIABLES     SN  TYPE            RELOCATION
 1274  ABRS       REAL      ARRAY     CON          10233  ACTST     REAL      ARRAY     STAT
  236  IC         INTEGER                            0  ICODE     INTEGER   ARRAY     CON
    0  ICRN       INTEGER             STAT         536  IFAC      INTEGER   ARRAY     CON
  230  IN         INTEGER                            1  INCODE    INTEGER   ARRAY     STAT
  231  INP        INTEGER                            0  IP        INTEGER               F.P.
  237  IVAR       INTEGER   ARRAY                  233  J         INTEGER
  234  K          INTEGER                          225  L         INTEGER
  226  M          INTEGER                        10543  NACT      INTEGER               STAT
  235  NK         INTEGER                         2032  NOSCODE   INTEGER               CON
  227  NP1        INTEGER                         7723  NSTP      INTEGER   ARRAY     STAT
    0  NUMPAR     INTEGER              F.P.       10544  PAR       REAL      ARRAY     STAT
  232  PERM       REAL                              63  TH        REAL      ARRAY     STAT

FILE NAMES       MODE
     TAPE1       UNFMT               TAPE2                          TAPE61    FMT

EXTERNALS        TYPE   ARGS
     EOF         REAL      1                                 INTRPOL           3
     ZEROV                 2

STATEMENT LABELS
    30  9                                    0  10                                  146  11       FMT
   125  12                                  73  50                                  162  55       FMT
   172  60       FMT                       114  70                                  211  75       FMT

LOOPS  LABEL    INDEX      FROM-TO     LENGTH     PROPERTIES
     6  10       L           10 13        13B          NOT INNER
    13  10       M           11 13         3B          OPT

COMMON BLOCKS    LENGTH
     CON           1051
     STAT          5727

STATISTICS
  PROGRAM LENGTH                  242B      162
  CM LABELED COMMON LENGTH      15172B     6778
        52000B CM USED
```

```
      SUBROUTINE INTRPOL(IP,IN,NK)
C
      DIMENSION PARAM(25), DEP(25)
      COMMON /STAT/ ICRN,INCODE(50),TH(20,200),NSTP(200),ACTST(200),
     1              NACT,PAR(25,51)
      COMMON /IN/ KDM,DEPTH(24),NOUT,KOUT(20),IZONES
      COMMON /CON/ ICODE(350),IFAC(350),ABRS(350),NOSCODE
C
CC    COMPRESS PROPERTY ARRAYS.
C
      N = 0
      NK = 1
      IC=INCODE(IP)
      IC=ICODE(IC)
      CALL ZEROV(PARAM,25)
      CALL ZEROV(DEP,25)
      DO 10 J=1,25
      IF (PAR(J,IP+1).EQ.-1.0) GO TO 10
      N = N+1
      PARAM(N) = PAR(J,IP+1)
      DEP(N) = PAR(J,1)
   10 CONTINUE
      TH(1,IN) = PARAM(1)
C
CC    WRITE THE ACTUAL PARAMETER OBSERVATIONS AND THEIR DEPTHS
CC    ONTO SCRATCH FILE 2
C
      IF (N.NE.0) WRITE(2) IN,PARAM,DEP
C
CC    INTERPOLATE A SINGLE VALUE FROM TOP TO BOTTOM IF THE PARAMETER
CC    IS NOT AN INTEGRATED ONE.
C
      IF (N.EQ.1.AND.(IC.EQ.225.OR.IC.EQ.267.OR.IC.EQ.613.OR.
     1  IC.EQ.614.OR.IC.EQ.124)) RETURN
      IF (N.NE.0) GO TO 1
      IN=IN-1
      NK=0
      RETURN
    1 IF (N.NE.1) GO TO 15
      N=2
      PARAM(2)=PARAM(1)
      DEP(2)=DEP(1)
C
CC    CALCULATE THE INTERPOLATED VALUES FOR THE PARAMETER AT THE
CC    STANDARD DEPTHS.
C
   15 CONTINUE
      J = 1
      DO 110 L=2,KDM
      NK = L
   40 TH(L,IN) = PARAM(J)
      IF (DEP(J).EQ.DEPTH(L)) GO TO 110
      IF (DEP(J).GT.DEPTH(L)) GO TO 50
      J = J+1
      IF(J.LE.N) GO TO 40
      TH(L,IN)=-1.0
      NK=NK-1
      RETURN
C
CC    PROPERTY-DEPTH INTERPOLATION
C
   50 IF (J.EQ.1) GO TO 110
      TH(L,IN) = PARAM(J-1)+(PARAM(J)-PARAM(J-1))*(DEPTH(L)
     $          -DEP(J-1))/(DEP(J)-DEP(J-1))
  110 CONTINUE
      RETURN
      END
```

SYMBOLIC REFERENCE MAP (R=1)

ENTRY POINTS
3 INTRPOL

VARIABLES	SN	TYPE		RELOCATION					
1274	ABRS	REAL	ARRAY	CON	10233	ACTST	REAL	ARRAY	STAT
176	DEP	REAL	ARRAY		1	DEPTH	REAL	ARRAY	IN
142	IC	INTEGER			0	ICODE	INTEGER	ARRAY	CON
0	ICRN	INTEGER		STAT	536	IFAC	INTEGER	ARRAY	CON
0	IN	INTEGER		F.P.	1	INCODE	INTEGER	ARRAY	STAT
0	IP	INTEGER		F.P.	56	IZONES	INTEGER		IN
143	J	INTEGER			0	KDM	INTEGER		IN
32	KOUT	INTEGER	ARRAY	IN	144	L	INTEGER		
141	N	INTEGER			10543	NACT	INTEGER		STAT
0	NK	INTEGER		F.P.	2032	NOSCODE	INTEGER		CON
31	NOUT	INTEGER		IN	7723	NSTP	INTEGER	ARRAY	STAT
10544	PAR	REAL	ARRAY	STAT	145	PARAM	REAL	ARRAY	
63	TH	REAL	ARRAY	STAT					

FILE NAMES	MODE
TAPE2	UNFMT

EXTERNALS	TYPE	ARGS
ZEROV		2

STATEMENT LABELS

56	1	30	10	64	15		
70	40	105	50	117	110		

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
24	10	J	17 22	5B	OPT
66	110	L	49 65	34B	

COMMON BLOCKS	LENGTH
STAT	5727
IN	47
CON	1051

STATISTICS

PROGRAM LENGTH	234B	156
CM LABELED COMMON LENGTH	152518	6825

520008 CM USED

```
      1                 SUBROUTINE FILL
                C
                C
                C       S/R FILL ASSIGNS A STATION NUMBER TO EACH CELL IN THE LAKE.
                C
      5                 COMMON /VARS/ XSTAT(200),YSTAT(200),LIN,DLAT
                        COMMON /MAP/ NO(300),IROW,ICOLMN,IZBO(300),NHYP(20,25)
                        COMMON /STAT/ ICRN,INCODE(50),TH(20,200),NSTP(200),ACTST(200),
                       1              NACT,PAR(25,51)
                C
     10                 DL2=DLAT/2.0
                        DO 50 J=1,ICOLMN
                        READ (35) (NO(I),I=1,IROW)
                        YO=J*DLAT-DL2
                        DO 40 I=1,IROW
     15                 XO=I*DLAT-DL2
                        IF (NO(I).EQ.0) GO TO 40
                        DISTO=1000000.0
                        DO 30 K=1,LIN
                        L=NSTP(K)
     20                 IF (L.EQ.0) GO TO 30
                        DX=XSTAT(L)-XO
                        DY=YSTAT(L)-YO
                        D2=DX*DX+DY*DY
                        IF(D2-DISTO) 20,30,30
     25                 C
                C       C  FOUND A CLOSER STATION
                C
                 20     DISTO=D2
                        KNEAR = K
     30                 30   CONTINUE
                        NO(I) = KNEAR
                 40     CONTINUE
                        WRITE (36) (NO(I),I=1,IROW)
                 50     CONTINUE
     35                 REWIND 35
                        REWIND 36
                        RETURN
                        END
```

SYMBOLIC REFERENCE MAP (R=1)

ENTRY POINTS
1 FILL

VARIABLES	SN	TYPE		RELOCATION					
10233	ACTST	REAL	ARRAY	STAT	110	DISTO	REAL		
621	DLAT	REAL		VARS	103	DL2	REAL		
113	DX	REAL			114	DY	REAL		
115	D2	REAL			105	I	INTEGER		
455	ICOLMN	INTEGER		MAP	0	ICRN	INTEGER		STAT
1	INCODE	INTEGER	ARRAY	STAT	454	IROW	INTEGER		MAP
456	IZBO	INTEGER	ARRAY	MAP	104	J	INTEGER		
111	K	INTEGER			116	KNEAR	INTEGER		
112	L	INTEGER			620	LIN	INTEGER		VARS
10543	NACT	INTEGER		STAT	1132	NHYP	INTEGER	ARRAY	MAP
0	NO	INTEGER	ARRAY	MAP	7723	NSTP	INTEGER	ARRAY	STAT
10544	PAR	REAL	ARRAY	STAT	63	TH	REAL	ARRAY	STAT
107	XO	REAL			0	XSTAT	REAL	ARRAY	VARS
106	YO	REAL			310	YSTAT	REAL	ARRAY	VARS

FILE NAMES	MODE		
TAPE35	UNFMT	TAPE36	UNFMT

STATEMENT LABELS

0	20	INACTIVE	43	30		47	40
0	50						

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
5	50	J	11 34	55B	EXT REFS NOT INNER
17	40	I	14 32	33B	NOT INNER
30	30	K	18 30	14B	OPT

```
COMMON BLOCKS    LENGTH
       VARS         402
       MAP        1102
       STAT       5727

STATISTICS
  PROGRAM LENGTH                117B      79
  CM LABELED COMMON LENGTH    16077B    7231
        520008 CM USED
```

```
      SUBROUTINE INTEGRT(IC)
C
C     THIS S/R INTEGRATES THE FOLLOWING AVERAGES:
C     LAYER AND INTEGRATED QUANTITY, LAYER AND INTEGRATED VOLUME,
C     AND VOLUME WEIGHTED VALUES FOR LAYER AND COLUMN.
C
      DIMENSION INACT(200),THSUM(20,25),NSUM(20,25),XNOB(25),DEP(25)
      DIMENSION NZ(200,17),ACTOB(500),ACTDP(500),ACSN(500)
      COMMON /MAP/ NO(300),IROW,ICOLMN,IZBO(300),NHYP(20,25)
      COMMON /IN/ KDM,DEPTH(24),NOUT,KOUT(20),IZONES
      COMMON /STAT/ ICRN,INCODE(50),TH(20,200),NSTP(200),ACTST(200),
     1              NACT,PAR(25,51)
      COMMON /VARS/ XSTAT(200),YSTAT(200),LIN,DLAT
      COMMON /CON/ ICODE(350),IFAC(350),ABRS(350),NOSCODE
      COMMON /SUM/ WAREA(25),Z17(5),Z25(5),IDZ17(5),IDZ25(5),
     1  QUANTT,I17,I25
      EQUIVALENCE(TH,NZ)
C
      PRINT 75
      LINE=0
      CALL ZEROV (THSUM,500)
      CALL ZEROV (NSUM,500)
      DO 300 M=1,ICOLMN
      READ (35) (IZBO(I),I=1,IROW)
      IF (EOF(35).NE.0) STOP 111
      READ (36) (NO(I),I=1,IROW)
      IF (EOF(36).NE.0) STOP 222
      DO 200 L=1,IROW
      IF (IZBO(L).EQ.0) GO TO 200
      NC = IZBO(L)
      INS = NO(L)
      DO 10 K=1,KDM
      IF (TH(K,INS).EQ.-1.0) GO TO 200
      THSUM(K,NC) = THSUM(K,NC)+TH(K,INS)
      NSUM(K,NC) = NSUM(K,NC)+1
   10 CONTINUE
  200 CONTINUE
  300 CONTINUE
      REWIND 35
      REWIND 36
      CALL ZEROV(NZ,3400)
      CALL ZEROV(INACT,200)
C
C     COMPUTE TOTALS FOR EACH DEPTH LAYER K FOR EACH ZONE.
C
      DO 30 M=1,ICOLMN
C  READ ZONE ASSIGNED TO EACH CELL
      READ (35) (IZBO(I),I=1,IROW)
      IF (EOF(35).NE.0) STOP 111
C  READ STATION ASSIGNED TO EACH CELL
      READ (36) (NO(I),I=1,IROW)
      IF (EOF(36).NE.0) STOP 222
      DO 20 L=1,IROW
      IF (IZBO(L).EQ.0) GO TO 20
      NC = IZBO(L)
      INS = NO(L)
      NS=NSTP(INS)
C
C     NZ CONTAINS UP TO 17 ZONES INFLUENCED BY STATION NS. (THE VALUES
C     AT STATION NS ARE INCLUDED IN CALCULATIONS FOR ZONE NC, SINCE THE
C     STATION IS WITHIN OR CLOSE TO THE ZONE)
C
      DO 9 I=1,17
      IF (NZ(NS,I).EQ.NC) GO TO 8
    9 CONTINUE
      DO 11 I=1,17
      IF (NZ(NS,I).NE.0) GO TO 11
      NZ(NS,I)=NC
      GO TO 8
   11 CONTINUE
    8 CONTINUE
      DO 15 IN=1,LIN
      KIN=NSTP(IN)
      IF (KIN.EQ.0) GO TO 15
      NX=XSTAT(KIN)/DLAT+0.5
      NY=YSTAT(KIN)/DLAT+0.5
      IF (NX.NE.L) GO TO 15
```

```
      IF (NY.NE.M) GO TO 15
C
C  STORE THE ZONE NC THAT THE STATION NS IS IN
C
      INACT(NS)=NC
15    CONTINUE
20    CONTINUE
30    CONTINUE
      J = 0
40    J = J+1
C
C     COMPUTE AREA WEIGHTED VALUES FOR EACH DEPTH IN ZONE J
C
      DO 50 I=1,KDM
      IF (NSUM(I,J).EQ.0) GO TO 60
      THSUM(I,J) = THSUM(I,J)/NSUM(I,J)
      THSUM(I,25) = THSUM(I,25)+THSUM(I,J)*NHYP(I,J)
50    NSUM(I,25) = NSUM(I,25)+NHYP(I,J)
C
      I = KDM+1
60    MAXD = I-1
C
C     PRINT OUT THE ZONE NUMBER THAT HAS BEEN ELIMINATED
C
      IF(MAXD.GE.1) GO TO 70
      PRINT 61,J
61    FORMAT(1H0//6X,5HZONE ,I2,20H HAS BEEN ELIMINATED)
      LINE=LINE+4
      IF(J-IZONES) 40,120,150
70    QUANT = 0.
      VOL = 0.
      NOBS=0
      IF (LINE.LT.72) GO TO 71
      LINE=1
      PRINT 75
75    FORMAT(1H1)
71    PRINT 159
159   FORMAT(1H0,135(1H-))
C
C  PRINT THE TITLES FOR THE ZONE REPORT
C
      PRINT 160, ICRN,J,ABRS(IC),ICODE(IC),DEPTH(1),
     $THSUM(1,J),NHYP(1,J),QUANT,VOL
160   FORMAT(1H0,7HCRUISE ,A7,5X,11HZONE NUMBER,I4,/1H0,
     $10HPARAMETER ,A4,1H(,I4,2H )//5X,5HDEPTH,5X,13HAREA WEIGHTED,
     $8X,4HAREA,10X,5HLAYER,7X,11HINTEGRATED ,7X,5HLAYER,7X,
     $11HINTEGRATED ,7X,22HVOLUME WEIGHTED VALUES/16X,10HMEAN VALUE,22X,
     $8HQUANTITY,7X,8HQUANTITY,9X,6HVOLUME,9X,6HVOLUME,9X,5HLAYER,9X,
     $6HCOLUMN//4X,F6.2,6X,F11.4,7X,I6,22X,E11.3,19X,E11.3)
      LINE=LINE+11
      IF (LINE.LE.72) GO TO 79
      LINE=0
      PRINT 111
C
79    M = MAXD
80    IF (THSUM(M,J).EQ.0.0) GO TO 90
      IF (NHYP(M,J).EQ.0.OR.MAXD.EQ.KDM) GO TO 100
      M = M+1
      MAXD = M
      GO TO 80
90    MAXD = M-1
100   ICHECK=0
      DO 110 M=2,MAXD
      IF(NHYP(M,J).EQ.0) ICHECK=ICHECK+1
      IF (ICHECK.EQ.2) GO TO 117
      DELC = DEPTH(M)-DEPTH(M-1)
      DELQ = (NHYP(M,J)*THSUM(M,J)+NHYP(M-1,J)*THSUM(M-1,J)+(NHYP(M-1,J)
     $*THSUM(M,J)+NHYP(M,J)*THSUM(M-1,J))/2.)*DELC/3.
      QUANT = QUANT+DELQ
      DELV = (NHYP(M,J)+NHYP(M-1,J))*DELC/2.
      VOL = VOL+DELV
      QMEAN = DELQ/DELV
      QCOL = QUANT/VOL
      PRINT 170, DELQ,DELV,QMEAN,DEPTH(M),THSUM(M,J),NHYP(M,J),QUANT,VOL
     $,QCOL
170   FORMAT (47X,E11.3,19X,E11.3,20X,F9.4/4X,F6.2,6X,F11.4,7X,I6,22X,2
     $(E11.4,19X),F10.4)
```

```
      C
            IF (DEPTH(M).EQ.1.0) WAREA(J)=THSUM(M,J)
            IF (DEPTH(M).EQ.1.0.AND.WAREA(J).EQ.0.0) WAREA(J)=THSUM(1,J)
            IF (J.NE.I17) GO TO 101
            DO 103 I=1,5
            IF (IDZ17(I).EQ.M) Z17(I)=THSUM(M,J)
            IF (M.EQ.MAXD.AND.IDZ17(I).EQ.0) Z17(I-1)=THSUM(M,J)
  103       CONTINUE
  101       IF (J.NE.I25) GO TO 102
            DO 104 I=1,5
            IF (IDZ25(I).EQ.M) Z25(I)=THSUM(M,J)
            IF (M.EQ.MAXD.AND.IDZ25(I).EQ.0) Z25(I-1)=THSUM(M,J)
  104       CONTINUE
            IF (M.EQ.MAXD) QUANTT=VOL*THSUM(M,J)*1000.*(DLAT**2)
  102       CONTINUE
      C
            LINE = LINE+2
            IF (LINE.LE.72) GO TO 110
            LINE = 3
            PRINT 111
  111       FORMAT(1H1,4X,5HDEPTH,5X,13HAREA WEIGHTED,8X,4HAREA,10X,
           $5HLAYER,7X,11HINTEGRATED ,7X,5HLAYER,7X,11HINTEGRATED ,7X,
           $22HVOLUME WEIGHTED VALUES/16X,10HMEAN VALUE,22X,
           $8HQUANTITY,7X,8HQUANTITY,9X,6HVOLUME,9X,6HVOLUME,9X,5HLAYER,9X,
           $6HCOLUMN,/1H )
      C
  110       CONTINUE
            M = MAXD+1
            IF (THSUM(M,J).EQ.0.0.AND.NHYP(M,J).GT.0) PRINT 100, DEPTH(M),NHYP
           $(M,J)
  100       FORMAT (/4X,F6.2,24X,I6)
            LINE=LINE+2
            IF (J.EQ.25) GO TO 115
  117       IF (NACT.NE.1) GO TO 115
            CALL ZEROV(ACTOB,500)
            CALL ZEROV(ACTDP,500)
            CALL BLANKV(ACSN,500)
            REWIND 2
            DO 5 NST=1,200
      C
      C     READ THE ACTUAL PARAMETER VALUES AND THEIR DEPTHS FROM
      C     SCRATCH FILE 2 FOR EACH STATION
      C
            READ (2) IN,XNOB,DEP
            IF (EOF(2).NE.0) GO TO 45
            IF (IN.NE.NST) STOP
            NSTT=NSTP(NST)
            DO 6 NSZ=1,17
            IF (NZ(NSTT,NSZ).EQ.0) GO TO 5
            IF (NZ(NSTT,NSZ).EQ.J) GO TO 7
    6       CONTINUE
            GO TO 5
    7       CONTINUE
            DO 4 MM=1,25
      C
      C     THE VALUES AND DEPTHS OF ALL THE ACTUAL OBSERVATIONS AFFECTING THIS
      C     ZONE ARE IN ACTOB AND ACTDP.  NOBS IS THE NUMBER OF OBSERVATIONS.
      C
            IF (XNOB(MM).EQ.0.0) GO TO 4
            NOBS=NOBS+1
            ACTOB(NOBS)=XNOB(MM)
            ACTDP(NOBS)=DEP(MM)
            IF (INACT(NSTT).EQ.J) ENCODE(4,2,ACSN(NOBS)) ACTST(NSTT)
    2       FORMAT(A3,1H*)
            IF (INACT(NSTT).NE.J) ENCODE(4,3,ACSN(NOBS)) ACTST(NST)
    3       FORMAT(A3,1H )
    4       CONTINUE
    5       CONTINUE
   45       PRINT 113,NOBS,J
  113       FORMAT(/1H0,*THERE ARE *,I3,* OBSERVATIONS AFFECTING *,
           1  *CALCULATIONS IN ZONE *,I2,/1H0,*VALUES WITH A *,1H*,
           1  * ARE ACTUAL OBSERVATIONS IN THE ZONE*,/1H )
            LINE=LINE+6
            IF (LINE.LE.72) GO TO 114
            PRINT 75
            LINE=0
  114       NN=-12
```

```
                      IF (NOBS.EQ.0) GO TO 115
                1110  NN=NN+13
                      KN=NN+12
      235             IF (NOBS.LT.13) KN=KN-13+NOBS
                       PRINT 1112,(ACSN(I),I=NN,KN)
                1112  FORMAT(1H0,*PERMANENT*,11X,13(A4,5X))
                      PRINT 112,(ACTOB(I),I=NN,KN)
                 112  FORMAT(1H ,*STATION NO.*,/1H ,*VALUE*,10X,13(F9.4))
      240             PRINT 110,(ACTDP(I),I=NN,KN)
                 110  FORMAT(1H ,*DEPTH*,13X,13(F5.1,4X))
                      LINE=LINE+5
                      IF (LINE.LE.72) GO TO 116
                      LINE=0
      245             PRINT 75
                 116  NOBS=NOBS-13
                      IF (NOBS.GT.0) GO TO 1110
                 115  IF (J-IZONES) 40,120,150
                C
      250        120  DO 130 I=1,KDM
                      IF (NSUM(I,25).EQ.0) GO TO 140
                 130  THSUM(I,25) = THSUM(I,25)/NSUM(I,25)
                      I = KDM+1
                 140  MAXD = I-1
      255             J = 25
                      GO TO 70
                 150  IF(NOUT.NE.0) PRINT 190,(KOUT(L),L=1,NOUT)
                 190  FORMAT(//10X,27HTHE ZONES NOT INCLUDED ARE , I3,20(1H,,I3))
                      RETURN
      260       C
                      END
```

CARD NR. SEVERITY DETAILS DIAGNOSIS OF PROBLEM

237 I 43CD 237 TOTAL RECORD LENGTH IS GREATER THAN 137 CHARACTERS. IT MAY EXCEED THE I/O DEVICE CAPACITY.

SYMBOLIC REFERENCE MAP (R=1)

ENTRY POINTS
3 INTEGRT

VARIABLES		SN	TYPE		RELOCATION
1274	ABRS		REAL	ARRAY	CON
4670	ACTDP		REAL	ARRAY	
10233	ACTST		REAL	ARRAY	STAT
1330	DELQ		REAL		
3653	DEP		REAL	ARRAY	
621	DLAT		REAL		VARS
0	IC		INTEGER		F.P.
0	ICODE		INTEGER	ARRAY	CON
0	ICRN		INTEGER		STAT
50	IDZ25		INTEGER	ARRAY	SUM
1315	IN		INTEGER		
1	INCODE		INTEGER	ARRAY	STAT
454	IROW		INTEGER		MAP
56	IZONES		INTEGER		IN
57	IZS		INTEGER		SUM
1313	K		INTEGER		
1316	KIN		INTEGER		
32	KOUT		INTEGER	ARRAY	IN
628	LIN		INTEGER		VARS
1306	M		INTEGER		
1337	MM		INTEGER		
1311	MC		INTEGER		
1340	MN		INTEGER		
1325	NOBS		INTEGER		
31	NOUT		INTEGER		IN
1334	NST		INTEGER		
1335	NSTT		INTEGER		
1336	NSZ		INTEGER		
1328	NY		INTEGER		

5654	ACSN	REAL	ARRAY	
3704	ACTOB	REAL	ARRAY	
1327	DELC	REAL		
1331	DELV	REAL		
1	DEPTH	REAL	ARRAY	IN
1307	I	INTEGER		
1326	ICHECK	INTEGER		
455	ICOLMN	INTEGER		MAP
43	IDZ17	INTEGER	ARRAY	SUM
536	IFAC	INTEGER	ARRAY	CON
1342	INACT	INTEGER	ARRAY	
1312	INS	INTEGER		
456	IZBO	INTEGER	ARRAY	MAP
56	I17	INTEGER		SUM
1321	J	INTEGER		
0	KDM	INTEGER		IN
1341	KN	INTEGER		
1310	L	INTEGER		
1305	LINE	INTEGER		
1322	MAXD	INTEGER		
10543	NACT	INTEGER		STAT
1132	NHYP	INTEGER	ARRAY	MAP
0	NO	INTEGER	ARRAY	MAP
2832	NOSCODE	INTEGER		CON
1314	NS	INTEGER		
7723	NSTP	INTEGER	ARRAY	STAT
2636	NSUM	INTEGER	ARRAY	
1317	NX	INTEGER		
63	NZ	INTEGER	ARRAY	STAT

VARIABLES	SN	TYPE	RELOCATION							
10544	PAR	REAL	ARRAY	STAT	1333	QCOL	REAL			
1332	QMEAN	REAL			1323	QUANT	REAL			
55	QUANTT	REAL		SUM	63	TH	REAL	ARRAY	STAT	
1652	THSUM	REAL	ARRAY		1324	VOL	REAL			
0	WAREA	REAL	ARRAY	SUM	3622	XNOB	REAL	ARRAY		
0	XSTAT	REAL	ARRAY	VARS	310	YSTAT	REAL	ARRAY	VARS	
31	Z17	REAL	ARRAY	SUM	36	Z25	REAL	ARRAY	SUM	

FILE NAMES	MODE								
OUTPUT	FMT	TAPE2	UNFMT	TAPE35	UNFMT	TAPE36	UNFMT		

EXTERNALS	TYPE	ARGS					
BLANKU		2					
ZEROU		2	EOF	REAL	1		

STATEMENT LABELS

1157	2	FMT	1166	3	FMT	556	4		
561	5		0	6		530	7		
150	8		0	9		0	10		
145	11		170	15		172	20		
0	30		201	40		564	45		
0	50		220	60		736	61	FMT	
231	70		240	71		767	75	FMT	
262	79		264	80		276	90		
300	100		407	101		442	102		
0	103		0	104		450	110		
1105	111	FMT	1234	112	FMT	1175	113	FMT	
574	114		641	115		636	116		
473	117		1246	118	FMT	644	120		
0	130		655	140		661	150		
774	159	FMT	1013	160	FMT	1072	170	FMT	
1140	180	FMT	1261	190	FMT	61	200		
0	360		576	1110		1224	1112	FMT	

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
15	300	M	23 30	528	EXT REFS NOT INNER
40	280	L	28 37	248	NOT INNER
45	10	K	32 36	140	OPT EXITS
1000	30	M	46 85	1000	EXT REFS NOT INNER
123	20	L	53 84	528	NOT INNER
131	9	I	63 65	60	OPT EXITS
140	11	I	66 70	100	OPT EXITS
154	15	IN	72 83	150	OPT
203	50	I	91 95	130	OPT EXITS
382	110	M	140 181	1510	EXT REFS EXITS NOT INNER
376	103	I	159 162	100	OPT
421	104	I	164 167	100	OPT
300	5	NST	193 222	560	EXT REFS EXITS NOT INNER
521	6	NSZ	202 205	70	OPT EXITS
531	4	MM	208 221	300	EXT REFS
645	130	I	250 252	60	OPT EXITS

COMMON BLOCKS	LENGTH
MAP	1102
IN	47
STAT	5727
VARS	402
COM	1051
SUM	40

STATISTICS

PROGRAM LENGTH	66308	3406
CM LABELED COMMON LENGTH	202710	8377
520000 CM USED		

```
      SUBROUTINE SUMRY(ABR,ICD,LAKE,IYR,ID1,ID2,ICRN)
C
      COMMON /IN/ KDM,DEPTH(24),NOUT,KOUT(20),IZONES
      COMMON /SUM/ WAREA(25),Z17(5),Z25(5),IDZ17(5),IDZ25(5),
     1   QUANT,I17,I25
      DIMENSION NAME(2,6)
C
      DATA NAME/10HLAKE ONTAR,2HIO,10HLAKE ERIE ,1H ,
     1          10HLAKE HURON,1H ,10HLAKE SUPER,3HIOR,
     1          10HLAKE CODE ,5HERROR,10HGEORGIAN B,2HAY/
C
      WRITE(61,1) IYR,NAME(1,LAKE),NAME(2,LAKE),ABR,ICD,ICRN,ID1,ID2
    1 FORMAT(1H0,18X,2H19,I2,5X,A10,A5,18X,*PARAMETER: *,A4,
     1  2H (,I3,1H),/1H ,44X,*DEPTH: 1.0*,/1H0,120(1H-),
     1  /1H ,*CRUISE*,7X,A7,/1H ,120(1H-),
     1  /1H ,*CRUISE  *,3X,A10,/1H ,*DATES     TO*,A10)
      WRITE(4,12) IYR,NAME(1,LAKE),NAME(2,LAKE),ABR,ICD,ID1,ID2,ICRN
   12 FORMAT(I2,A10,A5,A4,I3,2A10,A7)
      WRITE(61,6)
      WRITE(4,13)
   13 FORMAT(1H ,23(1H-))
C
      DO 2 I=1,IZONES
      IF (NOUT.EQ.0) GO TO 4
      DO 3 J=1,NOUT
      IF (KOUT(J).EQ.I) GO TO 2
    3 CONTINUE
    4 WRITE(61,5) I,WAREA(I)
    5 FORMAT(1H0,I6,F13.4)
      WRITE(4,5) I,WAREA(I)
    2 CONTINUE
      WRITE(61,6)
    6 FORMAT(1H ,120(1H-))
      WRITE(4,13)
      I=25
      WRITE(61,5) I,WAREA(I)
      WRITE(4,5) I,WAREA(I)
      WRITE(61,6)
      WRITE(4,13)
C
C SKIP REST OF SUMMARY REPORT FOR INTEGRATED PARAMETERS
C
      IF (ICD.EQ.225.OR.ICD.EQ.267.OR.ICD.EQ.613.OR.ICD.EQ.614
     1  .OR.ICD.EQ.124) GO TO 15
C
      IF (I17.EQ.0) GO TO 18
C
      DO 8 I=1,5
      M=IDZ17(I)
      IF (M.EQ.KDM) WRITE(61,9) Z17(I)
      IF (M.EQ.KDM) WRITE(4,9) Z17(I)
    9 FORMAT(1H0,*  BOTTOM=*,F11.4)
      IF (M.EQ.KDM) GO TO 18
      IF (M.EQ.0) WRITE(61,9) Z17(I-1)
      IF (M.EQ.0) WRITE(4,9) Z17(I-1)
      IF (M.EQ.0) GO TO 18
      IF (I.EQ.1) WRITE(61,7) I17,DEPTH(M),Z17(I)
    7 FORMAT(1H0,I2,F5.0,1HM,F11.4)
      IF (I.EQ.1) WRITE(4,7) I17,DEPTH(M),Z17(I)
      IF (I.NE.1) WRITE(61,11) DEPTH(M),Z17(I)
   11 FORMAT(1H0,F7.0,1HM,F11.4)
      IF (I.NE.1) WRITE(4,11) DEPTH(M),Z17(I)
    8 CONTINUE
C
   18 IF (I25.EQ.0) GO TO 15
C
      DO 20 I=1,5
      M=IDZ25(I)
      IF (M.EQ.KDM) WRITE(61,9) Z25(I)
      IF (M.EQ.KDM) WRITE(4,9) Z25(I)
      IF (M.EQ.KDM) GO TO 21
      IF (M.EQ.0) WRITE(61,9) Z25(I-1)
      IF (M.EQ.0) WRITE(4,9) Z25(I-1)
      IF (M.EQ.0) GO TO 21
      IF (I.EQ.1) WRITE(61,7) I25,DEPTH(M),Z25(I)
      IF (I.EQ.1) WRITE(4,7) I25,DEPTH(M),Z25(I)
      IF (I.NE.1) WRITE(61,11) DEPTH(M),Z25(I)
```

```
                      IF (I.NE.1) WRITE(4,11) DEPTH(M),Z25(I)
                   20 CONTINUE
          80       C
                   21 WRITE(61,6)
                      WRITE(4,13)
                      C
                      C  QUANTITY IS MEANINGLESS FOR SOME PARAMETERS
          85          C
                      IF (ICD.EQ.184.OR.ICD.EQ.168.OR.ICD.EQ.247) GO TO 15
                      C
                      WRITE(61,22) QUANT
                   22 FORMAT(1H0,*QUANTITY*,1PE11.2,4H KG.)
          90          WRITE(4,14) QUANT
                   14 FORMAT(1H0,*QUANTITY*,1PE11.2,4H KG.)
                   15 ENDFILE 4
                      C
                      DO 23 I=1,5
          95          Z17(I)=0.
                      Z25(I)=0.
                   23 CONTINUE
                      QUANT=0.
                      C
         100          RETURN
                      END
```

SYMBOLIC REFERENCE MAP (R=1)

ENTRY POINTS
3 SUMRY

VARIABLES	SN	TYPE		RELOCATION					
0	ABR	REAL		F.P.	1	DEPTH	REAL	ARRAY	IN
641	I	INTEGER			0	ICD	INTEGER		F.P.
0	ICRN	INTEGER		F.P.	43	IDZ17	INTEGER	ARRAY	SUM
50	IDZ25	INTEGER	ARRAY	SUM	0	ID1	INTEGER		F.P.
0	IDZ	INTEGER		F.P.	0	IYR	INTEGER		F.P.
56	IZONES	INTEGER		IN	56	I17	INTEGER		SUM
57	I25	INTEGER		SUM	642	J	INTEGER		
0	KDM	INTEGER		IN	32	KOUT	INTEGER	ARRAY	IN
0	LAKE	INTEGER		F.P.	643	M	INTEGER		
644	NAME	INTEGER	ARRAY		31	NOUT	INTEGER		IN
55	QUANT	REAL		SUM	0	WAREA	REAL	ARRAY	SUM
31	Z17	REAL	ARRAY	SUM	36	Z25	REAL	ARRAY	SUM

FILE NAMES	MODE		
TAPE4	FMT	TAPE61	FMT

STATEMENT LABELS											
341	1	FMT	45	2			0	3			
35	4		428	5	FMT		433	6	FMT		
513	7	FMT	0	8			471	9	FMT		
200	10		532	11	FMT		376	12	FMT		
410	13	FMT	633	14	FMT		314	15			
0	20		276	21			622	22	FMT		
0	23										

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES		
						EXT REFS	NOT INNER
26	2	I	23 31	229	OPT	EXITS	
50	3	J	25 27	58		EXT REFS	EXITS
184	8	I	48 63	748		EXT REFS	EXITS
282	20	I	67 79	748	OPT		
321	23	I	94 97	38			

COMMON BLOCKS	LENGTH
IN	47
SUM	48

STATISTICS		
PROGRAM LENGTH	6688	432
CM LABELED COMMON LENGTH	1378	95
520000 CM USED		

```
      SUBROUTINE ATTS2K(IDBN,IPACKF,IPACKN,IUSER)
C
C     THIS ROUTINE WILL ATTACH THE 6 OR 7 S2K FILES
C
C      INPUT - IDBN  THE 18 CHARACTER DATA BASE NAME (A18)
C
C              IPACKF  =1  IF THE FILES TO BE ATTACHED ARE ON A
C                          PRIVATE PACK.
C                      =0  IF THE FILES TO BE ATTACHED ARE ON A
C                          SYSTEM PACK(ONLINE)
C
C              IPACKN      THIS IS THE 4 CHARACTER(A4) PACK NAME.
C                          THIS IS NEEDED IF IPACKF=1
C
C              IUSER       THIS IS THE 3 CHARACTER(A3) USER NUMBER THE
C                          DATA BASE WAS CREATED UNDER.
C
C*****************************************************************
C        NOTE        TO USE THIS ROUTINE YOU MUST HAVE DONE A
C                    C A L L   U S E R D B X (  2 H D B )
C                    IN THE MAIN PROGRAM AND ALSO
C                    G E T , A U X L I B / U N = L I B R A R Y .
C                    L D S E T , L I B = A U X L I B .
C                    WHICH LOADS THE PF ROUTINE
C*****************************************************************
C
      DIMENSION LETTERS(7),C(20),X(5),IRM(4)
      INTEGER C,X
      DATA LETTERS/2HTA,2HTB,2HTC,2HTD,2HTE,2HTF,2HTU/
      DATA (C(I),I=11,20)/10*(1R )/,IRM(4)/0/
C
C     COMPUTE THE 5 DIGIT HASH CODE FROM THE DATA BASE NAME
C
C     NOTE -  THE ALGORITHM ASSUMES A 20 CHARACTER DBN BUT
C             WE ONLY USE A MAXIMUM OF 18 CHARACTERS DUE TO
C             OTHER REQUIREMENTS. ARRAY C WORDS 11 TO 20
C             ARE BLANK FILLED IN THE DATA STATEMENT.
C
C     CONVERT THE DBN TO R FORMAT
C
      DECODE(18,100,IDBN)(C(I),I=1,18)
  100 FORMAT(18R1)
C
C    COMPUTE THE HASH CODE
C
      DO 10 N=1,5
      X(N)=C(N)+C(N+5)+C(N+10)+C(N+15)
      X(N)=X(N).AND.37B
      IF(X(N).EQ.0)X(N)=6-N
   10 CONTINUE
C
C     CONVERT FROM R FORMAT TO A FORMAT
C
      ENCODE(5,200,IHASH)X
  200 FORMAT(5R1)
C
C   COMBINE THE 2 CHARACTER FILE IDENTIFIER WITH THE HASH CODE
C
      DO 11 I=1,7
      ENCODE(7,20,IFILENM)LETTERS(I),IHASH
   20 FORMAT(A2,A5)
C
C     THESE CALLS DEFAULT TO THE NA OPTION
C
C     IF THE DATA BASE IS ON A PRIVATE PACK WE HAVE TO
C           INCLUDE THIS INFORMATION IN THE CALL
C
      IF(IPACKF.NE.0)CALL PF("ATTACH",IFILENM,IFILENM,"RC",
     1 ICODE,"PN",IPACKN,"UN",IUSER)
      IF(IPACKF.EQ.0)CALL PF("ATTACH",IFILENM,IFILENM,"RC",
     1 ICODE,"UN",IUSER)
C
C     TRAP THE ERROR CODE BUT WE ALLOW FOR THE UPDATE LOG (FILE 7)
C        (FILE TU.....) NOT TO BE PRESENT
C
      IF(ICODE.EQ.2.AND.I.EQ.7) GO TO 11
```

```
                      IF(ICODE.NE.0)PRINT 400,IFILENM,ICODE,IPACKF,IPACKN,
                     1   IUSER
      00          400  FORMAT(*0 ERROR IN CALL PF  *,A7,2X,O4,2X,I1,2X,
                     1   A4,4X,A3)
                  C
                  C   ABORT THE JOB
                  C
      05            IF(ICODE.NE.0)CALL SYSTEM(52,* RUN ABORTED *)
                  11  CONTINUE
                      ENCODE(30,510,IRM)IDBN
                  510 FORMAT(*DB *,A10,* WAS ATTACHED    *)
                  C
      90          C   WRITE A MESSAGE INTO THE DAYFILE
                  C
                      CALL REMARK(IRM)
                      RETURN
                      END
```

```
CARD NR. SEVERITY  DETAILS    DIAGNOSIS OF PROBLEM
      71    I      )         ARGUMENT COUNT INCONSISTENT WITH PRIOR USAGE.
```

SYMBOLIC REFERENCE MAP (R=1)

ENTRY POINTS
3 ATTS2K

VARIABLES	SN	TYPE	RELOCATION						
212	C	INTEGER	ARRAY		176	I	INTEGER		
202	ICODE	INTEGER			0	IDBN	INTEGER		F.P.
201	IFILENM	INTEGER			200	IHASH	INTEGER		
0	IPACKF	INTEGER		F.P.	0	IPACKN	INTEGER		F.P.
243	IRM	INTEGER	ARRAY		0	IUSER	INTEGER		F.P.
203	LETTERS	INTEGER	ARRAY		177	N	INTEGER		
236	X	INTEGER	ARRAY						

FILE NAMES	MODE
OUTPUT	FMT

EXTERNALS	TYPE	ARGS		
PF		9	REMARK	1
SYSTEM		2		

STATEMENT LABELS

0	10		55	11		137	20	FMT	
120	100	FMT	127	200	FMT	151	400	FMT	
164	510	FMT							

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
13	10	N	46 58	79	OPT
26	11	I	59 86	328	EXT REFS

STATISTICS
PROGRAM LENGTH 2768 190
520000B CM USED

Appendix E
User Guide

THIS USER GUIDE IS SPECIFIC TO THE CYBER CDC 171 AND NOS. IT IS INCLUDED, HOWEVER, TO DEMONSTRATE THE INFORMATION REQUIRED TO RUN THE PROGRAM. "SPROCS", REFERRED TO IN LINE 4 OF THE PROGRAM, IS THE PROCEDURE FILE FOR ALDAR, USED TO ATTACK THE DATABASE , LIBRARY CODES, ETC.

```
PROGRAM ALDAR
*************

PURPOSE - TO CALCULATE VOLUME WEIGHTED AVERAGES FOR LAKE DATA BY
          ARBITRARY REGIONS (ZONES).

RUN INSTRUCTIONS -

ALDAR.
USER(NNN,MMM)      NNN-USER NUMBER,MMM-PASSWORD
CHARGE,XXX,YYY.    XXX-CHARGE CODE,YYY-STUDY NUMBER
GET,SPROCS/UN=882.
BEGIN,ALDAR,SPROCS,INFIL=FILENAME,REPS=YN.
            NOTE - FILENAME IS THE NAME OF THE ZONED BATHYMETRY FILE
                   COL 1 -4 "ZBAT"
                         5 A NUMBER GIVING THE SIZE OF THE GRID IN KM.
                         6 "K"
                         7 AN LETTER GIVING THE LAKE
                           O LAKE ONTARIO
                           E LAKE ERIE
                           S LAKE SUPERIOR
                           G GEORGIAN BAY
                           H LAKE HURON
                        I.E. ZBAT2KO IS THE FILE NAME FOR A ZONED 2
                                  KM. GRID FOR LAKE ONTARIO.
            NOTE - WHEN YN IS YES (DEFAULT) THE SUMMARY REPORT IS
                             ADDED TO FILE ALDREPS.
                   WHEN YN IS NO THE SUMMARY REPORT IS NOT ADDED.
7-8-9
CARD 1    COL  1-10 DATA BASE PASSWORD (LEFT JUSTIFIED)
              11-20 DATA BASE NAME (LEFT JUSTIFIED)
                 21 =1 IF THE FILES TO BE ATTACHED ARE ON A
                       PRIVATE PACK.
                    =0 IF THE FILES TO BE ATTACHED ARE ON A
                       SYSTEM PACK (ONLINE).
              22-25 THIS IS THE 4 CHARACTER(A4) PACK NAME.
                    THIS IS NEEDED IF COLUMN 21 IS 1.

              27-29 THIS IS THE 3 CHARACTER(A3) USER NUMBER
                    THE DATA BASE WAS CREATED UNDER.
                    REFER TO DATA BASE NAMES TABLES.
CARD 2    COL  1- 3 NO. OF PARAMETER CODES TO BE READ (MAXIMUM OF 50)
                    (RIGHT JUSTIFIED)
                 9 =1 IF ACTUAL OBSERVATIONS IN EACH ZONE ARE LISTED.
                    =0 THEY ARE NOT LISTED
CARD 3              GIVES THE ZONE NUMBER OF THOSE ZONES IN THE LAKE THAT
                  ARE NOT TO BE INCLUDED IN THE CALCULATIONS
          COL 1-2 NUMBER OF ZONES TO BE EXCLUDED (RIGHT JUSTIFIED)
              3-5 1ST ZONE NUMBER
              6-8 2ND ZONE NUMBER
                  ...
                  ETC. 20TH ZONE NUMBER
```

```
                NOTE - THIS CARD IS LEFT BLANK IF ALL THE ZONES ARE BEING
                       EXAMINED.
CARDS 4,5,6     THESE CARDS SPECIFY THE STANDARD DEPTHS TO WHICH
                PARAMETERS VALUES ARE TO BE INTERPOLATED, A MAXIMUM
                OF 20 STANDARD DEPTHS IS ALLOWED.(8 PER CARD)
          COL   1-10 1ST DEPTH (F5.0)
                11-20 2ND DEPTH
                ...
                ...
                      20TH DEPTH (CARD 6)
                NOTE - ALL 3 DEPTH CARDS MUST BE SUBMITTED EVEN IF LESS
                       THAN 20 DEPTHS ARE DESIRED,THE REMAINING
                       DEPTH FIELDS ARE LEFT BLANK.
CARD 7    COL 1-7   THIS CARD SPECIFIES THE CRUISE NUMBER WANTED.
                    I.E 7822003
CARD 8 (9,10) PARAMETER CODE CARD
          COL   2- 4 FIRST PARAMETER CODE
                6- 8 2ND PARAMTER CODE
               10-12 3RD PARAMETER CODE
               ...
               ...
               ETC.  SPECIFY THE PARAMETER CODES FOR THE NO. OF
                     PARAMETERS TO BE READ (GIVEN ON CARD 2).  USE
                     1, 2, OR 3 CARDS WITH 20 CODES PER CARD.
                       IF EBT VALUES ARE WANTED, ONLY ONE CODE MUST BE
                     SPECIFIED, AND IT MUST BE A TEMPERATURE CODE (100
                     OR 104).  THIS TEMPERATURE CODE WILL ONLY BE USED
                     FOR STATIONS WHERE EBTS ARE NOT AVAILABLE.
                       IF CODE 104 IS SELECTED FOR A CRUISE BEFORE 1972,
                     IT IS CHANGED TO CODE 100, SINCE 104 IS NOT AVAILABLE.
CARD 11         THE NEXT 2 CARDS GIVE THE DEPTH NUMBERS FOR 2 ZONES
                IN THE SUMMARY REPORT OF AREA WEIGHTED MEAN VALUES.
            COL 3- 4 ZONE NUMBER FOR WHICH SEVERAL DEPTHS ARE SPECIFIED
                7- 8 1ST DEPTH NUMBER (1-20)
               11-12 2ND DEPTH NUMBER
               15-16 3RD DEPTH NUMBER
               ...
               ETC. UP TO 5 DEPTH NUMBERS CORRESPONDING TO THE STANDARD
                    DEPTHS GIVEN IN CARDS 4 TO 6.  FOR THE BOTTOM DEPTH,
                    GIVE THE LAST DEPTH NUMBER.
CARD 12         SAME FORMAT AS CARD 11.
                THE ZONE NUMBER MUST BE 25 (ENTIRE LAKE)

6-7-8-9
```

Appendix F
Sample Output

NOTE: Only the leading page and the output for code 104 (temperature) are shown.

ALDAR

NUMBER OF PARAMETER CODES = 4

ACTUAL OBSERVATIONS IN EACH ZONE WILL BE PRINTED

THE FOLLOWING 1 ZONES ARE EXCLUDED: 8

13 STANDARD DEPTHS:

0.00 1.00 5.00 10.00 20.00 40.00 90.00 140.00
150.00 175.00 200.00 210.00 225.00

CRUISE 7822803

PARAMETER CODES: 30 100 104 276

DEPTH NUMBERS FOR ZONE 17 IN SUMMARY REPORT ARE 5 6 13

DEPTH NUMBERS FOR ZONE 25 IN SUMMARY REPORT ARE 5 6 13

LAKE ONTARIO(2KM.) IS BEING STUDIED

PARAMETER T EB (104)

STANDARD DEPTHS:

PSN	0.	1.	5.	10.	20.	40.	90.	140.	150.	175.	200.	210.	225.
001	1.90	1.90	1.90	1.90	2.09								
003	1.83	1.83	1.82	1.81	1.80								
002	1.78	1.78	1.78	1.78	1.78	1.88							
005	2.00	2.00	2.00	2.00	2.09								
006	1.78	1.78	1.78	1.78	1.78	1.80							
014	1.78	1.78	1.78	1.78	1.78	1.76	1.90						
013	1.50	1.50	1.50	1.50	1.50	1.50	1.85						
012	1.40	1.40	1.40	1.40	1.40	1.56	2.00						
007	1.00	1.00	1.00	1.00	1.00	1.00							
000	2.10	2.10	2.10	2.10									
009	1.00	1.00	1.00	1.00	1.00	1.00	1.60						
011	1.40	1.40	1.40	1.40	1.40	1.55							
010	2.00	2.00	2.00	2.00									
005	1.60	1.60	1.60	1.60	1.61	1.85							
027	1.20	1.20	1.21	1.22	1.25	1.30	1.93						
028	1.60	1.60	1.60	1.60	1.60	1.60							
029	2.20	2.20	2.20	2.20	2.20								
030	1.90	1.90	1.90	1.90	1.90	1.90							
032	1.50	1.50	1.50	1.50	1.50	1.53							
031	2.30	2.30	2.30	2.30									
091	2.20	2.20	2.20	2.20									
043	2.40	2.40	2.40	2.40									
042	1.50	1.50	1.50	1.50	1.50	1.54							
041	1.10	1.10	1.10	1.10	1.10	1.16	1.37						
044	1.70	1.70	1.70	1.70	1.70	1.70							
045	1.20	1.20	1.20	1.20	1.27	1.39							
046	1.70	1.70	1.70	1.70	1.70	1.85							
047	2.40	2.40	2.44	2.50									
040	1.33	1.33	1.33	1.33	1.33								
049	1.40	1.40	1.40	1.40	1.41	1.42							
061	1.20	1.20	1.20	1.20	1.27	1.63							
063	.80	.80	.79	.78	.77	.82							
062	1.40	1.40	1.40										
004	1.10	1.10	1.10	1.10	1.03								
001	.92	.92	.92	.91	.93								
003	.80	.80	.80	.80	.80								
002	1.10	1.10	1.07	1.04	1.03								
000	.60	.60	.60	.60	.60								
079	.40	.40	.40	.40									
078	.40	.40	.40	.40	.40								
077	.40	.40	.40	.40	.40								
098	.30	.30	.30	.30									
075	.30	.30	.26	.20	.27								
074	1.20	1.20	1.16	1.10	1.10	1.10							
009	1.30	1.30	1.30	1.30	1.29	1.39							
073	1.60	1.60	1.56	1.50	1.50								
008	1.25	1.25	1.26	1.28	1.26	1.42							
072	1.20	1.20	1.20	1.20	1.20	1.25	1.44						
071	2.30	2.30	2.20	2.25									
070	1.10	1.10	1.10	1.10	1.10	1.10	1.10	2.22	2.46				
069	.00	.00	.00	.79	.79	.78	.92	2.31	2.39				
068	1.00	1.00	1.00	1.00	.99	.99	.97	2.23	2.58	2.78			
067	1.30	1.30	1.29	1.28	1.27	1.30							
066	2.00	2.00	2.00	2.00									
095	1.52	1.52	1.52	1.52	1.53	1.67							
065	1.19	1.19	1.19	1.20	1.20	1.21	1.25	2.29	2.39				
064	.90	.90	.91	.91	.93	.96	1.04	1.90	2.32	2.69	2.81	2.86	
060	1.00	1.00	1.00	1.00	1.00	1.00	1.13	2.22	2.44				
094	1.50	1.50	1.50	1.50	1.50	1.56							
059	1.10	1.10	1.10	1.10	1.10	1.10	1.10	2.02	2.04	2.90			
055	1.10	1.10	1.10	1.10	1.10	1.10	1.10	2.53	2.80	2.80			
058	1.30	1.30	1.30	1.30	1.30	1.30							
056	1.25	1.25	1.25	1.25	1.25	1.25	1.25						
054	1.20	1.20	1.20	1.20	1.20	1.20	1.20	3.00					
007	1.50	1.50	1.50	1.50	1.50								
057	2.20	2.20	2.20	2.20									
053	1.00	1.00	1.00	1.00	1.94								
052	1.28	1.28	1.28	1.28	1.27	1.27	1.38						
038	1.90	1.90	1.90	1.90									

PARAMETER T EB (104)

039	1.30	1.30	1.30	1.30	1.30	1.30	1.30	2.70		
040	1.30	1.30	1.30	1.30	1.30	1.31	1.32	3.03	3.04	3.07
036	1.30	1.30	1.30	1.30	1.30	1.30	1.30	2.73	2.80	
037	1.85	1.85	1.83	1.80	1.80					
035	1.25	1.25	1.24	1.22	1.22					
034	1.52	1.52	1.52	1.52	1.52	1.52	1.53			
033	1.35	1.35	1.35	1.35	1.35	1.35	1.35			
026	1.30	1.30	1.30	1.30	1.30	1.30	1.74			
025	1.60	1.60	1.60	1.60	1.60	1.60	2.34			
024	1.50	1.50	1.50	1.50	1.50	1.50	2.35			
023	1.40	1.40	1.40	1.40	1.40	1.40	1.77			

093	1.20	1.20	1.20	1.20			
022	.97	.97	.97	.97			
021	2.38	2.38	2.34	2.40			
006	3.40	3.40	3.43	3.46			
020	1.50	1.38	1.50	1.50	1.50	1.52	
019	1.48	1.48	1.48	1.48	1.48	1.48	1.74
018	1.67	1.67	1.67	1.67	1.69	1.72	
017	2.65	2.65	2.72	2.80			
016	1.70	1.70	1.70	1.70	1.71	1.71	
096	2.33	2.33	2.35	2.37	2.47		
015	1.53	1.53	1.53	1.53	1.56	1.62	

CRUISE 7822003 ZONE NUMBER 1

PARAMETER T EB(104)

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	VOLUME WEIGHTED VALUES COLUMN
0.00	.6727	278		0.		0.		
			.187E+03		.278E+03		.6727	.6727
1.00	.6727	278		.1870E+03		.2788E+03		
			.721E+03		.187E+04		.6711	.6714
5.00	.6695	259		.9077E+03		.1352E+04		
			.827E+03		.127E+04		.6539	.6629
10.00	.6381	247		.1735E+04		.2617E+04		
			.142E+04		.211E+04		.6742	.6688
20.00	.7148	174		.3154E+04		.4722E+04		
40.00		7						

THERE ARE 33 OBSERVATIONS AFFECTING CALCULATIONS IN ZONE 1

VALUES WITH A * ARE ACTUAL OBSERVATIONS IN THE ZONE

PERMANENT STATION NO.	862	862	864	864	864	864	881*	881*	881*	881*	883*	883*	883*
VALUE	1.4000	1.4000	1.1000	1.1000	1.0000	1.0000	.9200	.9100	.9400	1.0200	.0000	.0000	.0000
DEPTH	1.0	9.5	1.0	10.0	25.0	36.0	1.0	10.0	25.0	34.0	1.0	10.0	25.0
PERMANENT STATION NO.	883*	882*	882*	882*	888*	888*	888*	879*	879*	879*	878*	878*	878*
VALUE	.0000	1.1000	1.0400	1.0200	.6000	.6000	.6000	.4000	.4000	.4000	.4000	.4000	.4000
DEPTH	30.0	1.0	10.0	25.0	1.0	10.0	20.0	1.0	10.0	18.5	1.0	10.0	24.0
PERMANENT STATION NO.	877*	877*	877*	877*	898*	898*	898*						
VALUE	.4000	.4000	.4000	.4000	.3000	.3000	.3000						
DEPTH	1.0	10.0	25.0	28.0	1.0	10.0	17.0						

CRUISE 7822003 ZONE NUMBER 2

PARAMETER T EB(104)

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	VOLUME WEIGHTED VALUES COLUMN
0.00	1.2438	73		0.		0.		
			.908E+02		.738E+02		1.2438	1.2438
1.00	1.2438	73		.9068E+02		.7308E+02		
			.346E+03		.278E+03		1.2435	1.2436
5.00	1.2431	66		.4365E+03		.3518E+03		
			.347E+03		.385E+03		1.1307	1.1948
10.00	1.0284	56		.7838E+03		.6568E+03		
			.508E+03		.485E+03		1.0319	1.1255
20.00	1.0357	41		.1284E+04		.1141E+04		
			.681E+03		.588E+03		1.1747	1.1421
40.00	1.3582	17		.1966E+04		.1721E+04		

THERE ARE 18 OBSERVATIONS AFFECTING CALCULATIONS IN ZONE 2

VALUES WITH A * ARE ACTUAL OBSERVATIONS IN THE ZONE

PERMANENT STATION NO.	861	861	861	861	863	863	863	863	862*	862*	864	864	864
VALUE	1.2000	1.2000	1.3000	1.6700	.0000	.7000	.7700	.9700	1.4000	1.4000	1.1000	1.1000	1.0000
DEPTH	1.0	10.0	25.0	42.0	1.0	10.0	25.0	83.0	1.0	9.5	1.0	10.0	25.0

PERMANENT STATION NO.	884	883	883	883	883
VALUE	1.0000	.0000	.0000	.0000	.0000
DEPTH	50.0	1.0	10.0	25.0	50.0

CRUISE 7822883 ZONE NUMBER 3

PARAMETER T EB(184)

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	VOLUME WEIGHTED VALUES COLUMN
0.00	1.4873	128		0.		0.	1.4873	
1.00	1.4873	128	.198E+03	.198E+03	.129E+03	.129E+03	1.4900	1.4873
5.00	1.4943	119	.736E+03	.934E+03	.494E+03	.622E+03	1.4906	1.4901
10.00	1.5030	112	.865E+03	.1792E+04	.578E+03	.1200E+04	1.4257	1.4942
20.00	1.3410	85	.148E+04	.3197E+04	.983E+03	.2183E+04	1.4283	1.4632
40.00	1.5371	23	.153E+04	.4731E+04	.108E+04	.3265E+04		1.4491

THERE ARE 18 OBSERVATIONS AFFECTING CALCULATIONS IN ZONE 3

VALUES WITH A * ARE ACTUAL OBSERVATIONS IN THE ZONE

PERMANENT STATION NO.	846	846	846	846	847*	847*	847*	848*	848*	848*	849	849	849
VALUE	1.7000	1.7000	1.7000	1.0000	2.4000	2.3000	2.7000	1.3300	1.3300	1.3300	1.4000	1.4000	1.4200
DEPTH	1.0	10.0	25.0	45.0	1.0	10.0	14.0	1.0	10.0	20.0	1.0	10.0	20.0

PERMANENT STATION NO.	849	861	861	861	861
VALUE	1.4200	1.2000	1.2000	1.2000	1.6700
DEPTH	40.0	1.0	10.0	25.0	42.0

CRUISE 7822883 ZONE NUMBER 4

PARAMETER T EB(184)

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	VOLUME WEIGHTED VALUES COLUMN
0.00	1.9583	187		0.		0.	1.9583	
1.00	1.9583	187	.366E+03	.366E+03	.187E+03	.187E+03	1.9600	1.9583
5.00	1.9614	179	.143E+04	.1881E+04	.732E+03	.919E+03	1.9633	1.9595
10.00	1.9652	169	.171E+04	.3589E+04	.878E+03	.1789E+04	1.8132	1.9613
20.00	1.6547	138	.279E+04	.6295E+04	.154E+04	.3324E+04	1.7818	1.8936
40.00	1.7574	75	.362E+04	.9918E+04	.213E+04	.5454E+04		1.8185

THERE ARE 28 OBSERVATIONS AFFECTING CALCULATIONS IN ZONE 4

VALUES WITH A * ARE ACTUAL OBSERVATIONS IN THE ZONE

PERMANENT STATION NO.	831	831	831	891*	891*	891*	843*	843*	843*	842	842	842	842
VALUE	2.3000	2.3000	2.3000	2.2000	2.2000	2.2000	2.4000	2.4000	2.4000	1.5000	1.5000	1.5000	1.6000
DEPTH	1.0	10.0	10.0	1.0	10.0	16.5	1.0	10.0	19.0	1.0	10.0	25.0	63.0
PERMANENT STATION NO.	844*	844*	844*	844*	845	845	845	845	846*	846*	846*	846*	847
VALUE	1.7000	1.7000	1.7000	1.8000	1.2000	1.2000	1.3000	1.6000	1.7000	1.7000	1.7000	1.9000	2.4000
DEPTH	1.0	10.0	25.0	44.5	1.0	10.0	25.0	76.0	1.0	10.0	25.0	45.0	1.0
PERMANENT STATION NO.	847	847											
VALUE	2.5000	2.7500											
DEPTH	10.0	14.5											

CRUISE 7822883 ZONE NUMBER 5

PARAMETER T EB(184)

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	VOLUME WEIGHTED VALUES COLUMN
0.00	1.8253	178		0.		0.	1.8253	
1.00	1.8253	178	.325E+03	.3249E+03	.178E+03	.1780E+03	1.8256	1.8253
5.00	1.8260	171	.127E+04	.1599E+04	.698E+03	.8760E+03	1.8264	1.8256
10.00	1.8269	161	.152E+04	.3119E+04	.830E+03	.1706E+04	1.7868	1.8260
20.00	1.7429	138	.267E+04	.5785E+04	.158E+04	.3281E+04	1.7448	1.8073
40.00	1.7471	91	.400E+04	.9781E+04	.229E+04	.5491E+04	1.8847	1.7812
90.00	1.9000	13	.469E+04	.1447E+05	.268E+04	.8091E+04		1.7000

THERE ARE 33 OBSERVATIONS AFFECTING CALCULATIONS IN ZONE 5

VALUES WITH A * ARE ACTUAL OBSERVATIONS IN THE ZONE

PERMANENT STATION NO.	818	818	818	805*	805*	805*	805*	827*	827*	827*	827*	828*	828*
VALUE	2.6000	2.6000	2.6000	1.6000	1.6000	1.6200	1.8300	1.2000	1.4000	2.3000	2.3000	1.6000	1.6000
DEPTH	1.0	10.0	13.0	1.0	10.0	25.0	43.0	1.0	83.0	95.0	97.0	1.0	16.0
PERMANENT STATION NO.	828*	828*	829*	829*	829*	838*	838*	838*	838*	832	832	832	832
VALUE	1.6000	1.6000	2.2000	2.2000	2.2000	1.9000	1.9000	1.9000	1.9000	1.5000	1.5000	1.5000	1.6000
DEPTH	25.0	90.5	1.0	10.0	20.0	1.0	10.0	25.0	40.0	1.0	10.0	25.0	73.0
PERMANENT STATION NO.	831*	831*	831*	826	826	826	826						
VALUE	2.3000	2.3000	2.3000	1.3000	1.3000	2.6300	2.6300						
DEPTH	1.0	10.0	10.0	1.0	80.0	110.0	119.0						

CRUISE 7222883 ZONE NUMBER 6

PARAMETER T EB(184)

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	VOLUME WEIGHTED VALUES COLUMN
0.00	1.7494	86		0.		0.	1.7494	
1.00	1.7494	85	.149E+03	.1487E+03	.858E+02	.8588E+02		1.7494

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	VOLUME WEIGHTED VALUES COLUMN
5.00	1.7494	78	.570E+03	.7190E+03	.326E+03	.4110E+03	1.7494	1.7494
10.00	1.7494	71	.652E+03	.1371E+04	.373E+03	.7835E+03	1.7494	1.7494
20.00	1.6419	62	.113E+04	.2499E+04	.665E+03	.1449E+04	1.6969	1.7253
40.00	1.6686	48	.182E+04	.4315E+04	.118E+04	.2549E+04	1.6589	1.6932
90.00	2.0753	18	.264E+04	.6958E+04	.145E+04	.3999E+04	1.8227	1.7481

THERE ARE 26 OBSERVATIONS AFFECTING CALCULATIONS IN ZONE 6

VALUES WITH A * ARE ACTUAL OBSERVATIONS IN THE ZONE

PERMANENT STATION NO.	006	006	006	006	012	012	012	012	007*	007*	007*	007*	008*
VALUE	1.7000	1.7000	1.7000	1.9000	1.4000	1.4000	1.4000	2.2000	1.8000	1.8000	1.8000	1.8000	2.1000
DEPTH	1.0	10.0	25.0	67.0	1.0	10.0	25.0	102.0	1.0	10.0	25.0	44.0	1.0
PERMANENT STATION NO.	008*	008*	009*	009*	009*	009*	011*	011*	011*	011*	010*	010*	010*
VALUE	2.1000	2.1000	1.8000	1.8000	1.8000	1.4000	1.4000	1.4000	1.4000	1.9000	2.0000	2.0000	2.0000
DEPTH	10.0	13.5	1.0	10.0	25.0	55.0	1.0	10.0	25.0	85.0	1.0	10.0	13.0

CRUISE 7822003 ZONE NUMBER 7

PARAMETER T EB(104)

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	VOLUME WEIGHTED VALUES COLUMN
0.00	1.9478	138		0.		0.		
1.00	1.9478	138	.269E+03	.2687E+03	.138E+03	.1380E+03	1.9478	1.9478
5.00	1.9480	124	.102E+04	.1209E+04	.524E+03	.6620E+03	1.9479	1.9477
10.00	1.9511	111	.115E+04	.2435E+04	.588E+03	.1250E+04	1.9499	1.9480
20.00	2.0007	85	.194E+04	.4374E+04	.988E+03	.2238E+04	1.9786	1.9619
40.00	1.8414	47	.255E+04	.6926E+04	.132E+04	.3550E+04	1.9331	1.9512

THERE ARE 29 OBSERVATIONS AFFECTING CALCULATIONS IN ZONE 7

VALUES WITH A * ARE ACTUAL OBSERVATIONS IN THE ZONE

PERMANENT STATION NO.	001*	001*	001*	003*	003*	003*	002*	002*	002*	002*	005*	005*	005*
VALUE	1.9000	1.9000	2.2000	1.8300	1.8100	1.8000	1.7000	1.7000	1.7000	2.0000	2.0000	2.0000	2.1300
DEPTH	1.0	10.0	26.0	1.0	10.0	28.5	1.0	10.0	25.0	58.0	1.0	10.0	25.0
PERMANENT STATION NO.	005*	006*	006*	006*	006*	007	007	007	007	016	016	016	016
VALUE	2.4000	1.7000	1.7000	1.7000	1.9000	1.8000	1.8000	1.8000	1.8000	1.7000	1.7000	1.7200	1.7000
DEPTH	27.0	1.0	10.0	25.0	67.0	1.0	10.0	25.0	44.0	1.0	10.0	25.0	62.0
PERMANENT STATION NO.	006*	006*	006*										
VALUE	2.3300	2.3700	2.4700										
DEPTH	1.0	10.0	20.0										

ZONE 8 HAS BEEN ELIMINATED

CRUISE 7822003 ZONE NUMBER 9

PARAMETER T EB(104)

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	COLUMN
0.00	1.8230	133		0.		0.	1.8230	1.8230
1.00	1.8230	133	.242E+03	.242E+03	.133E+03	.133E+03	1.8311	1.8294
5.00	1.8393	126	.948E+03	.1191E+04	.518E+03	.651E+03	1.8493	1.8390
10.00	1.8596	115	.111E+04	.2305E+04	.603E+03	.125E+04	1.7436	1.7967
20.00	1.6155	85	.174E+04	.4049E+04	.100E+04	.225E+04	1.6263	1.7203
40.00	1.6381	66	.246E+04	.6508E+04	.151E+04	.376E+04	1.6083	1.7144
90.00	1.7662	14	.330E+04	.9881E+04	.288E+04	.576E+04		

THERE ARE 36 OBSERVATIONS AFFECTING CALCULATIONS IN ZONE 9

VALUES WITH A * ARE ACTUAL OBSERVATIONS IN THE ZONE

PERMANENT STATION NO.	035	035	035	023*	023*	023*	023*	093*	093*	093*	022*	022*	022*
VALUE	1.2500	1.2200	1.2200	1.4000	1.4000	1.4000	1.8000	1.2000	1.2000	1.2000	.9700	.9700	.9700
DEPTH	1.0	10.0	24.5	1.0	10.0	25.0	96.0	1.0	10.0	10.0	1.0	10.0	13.0
PERMANENT STATION NO.	021*	021*	021*	006*	006*	028*	028*	028*	028*	018*	018*	018*	018*
VALUE	2.3000	2.4000	2.4000	3.4000	3.4700	1.5000	1.5000	1.5000	1.6000	1.6700	1.6700	1.7000	1.7000
DEPTH	1.0	10.0	14.0	1.0	11.0	1.0	10.0	25.0	80.0	1.0	10.0	25.0	85.0
PERMANENT STATION NO.	017*	017*	017*	016*	016*	016*	016*	096	096	096			
VALUE	2.6500	2.8000	3.3000	1.7000	1.7000	1.7200	1.7000	2.3300	2.3700	2.4700			
DEPTH	1.0	10.0	14.0	1.0	10.0	25.0	62.0	1.0	10.0	20.0			

CRUISE 7822003 ZONE NUMBER 10

PARAMETER T EB(104)

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	COLUMN
0.00	1.4606	581		0.		0.	1.4606	1.4606
1.00	1.4606	581	.736E+03	.736E+03	.581E+03	.581E+03	1.4688	1.4688
5.00	1.4691	581	.294E+04	.3679E+04	.288E+04	.288E+04	1.4694	1.4691
10.00	1.4697	581	.368E+04	.7360E+04	.251E+04	.539E+04	1.4721	1.4706
20.00	1.4745	581	.738E+04	.1474E+05	.581E+04	.1082E+05	1.4916	1.4811
40.00	1.5087	581	.149E+05	.2968E+05	.108E+05	.2004E+05	1.6998	1.5985
90.00	1.8984	435	.398E+05	.6944E+05	.234E+05	.4344E+05		

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	COLUMN
140.00		27						

THERE ARE 93 OBSERVATIONS AFFECTING CALCULATIONS IN ZONE 10

VALUES WITH A * ARE ACTUAL OBSERVATIONS IN THE ZONE

PERMANENT STATION NO.	003	003	003	002	002	002	002	006	006	006	006	014*	014*
VALUE	1.8300	1.8100	1.8000	1.7000	1.7000	1.7000	2.0000	1.7000	1.7000	1.7000	1.9000	1.7000	1.7000
DEPTH	1.0	10.0	20.5	1.0	10.0	25.0	50.0	1.0	10.0	25.0	67.0	1.0	10.0
PERMANENT STATION NO.	014*	014*	013*	013*	013*	013*	012*	012*	012*	012*	011	011	011
VALUE	1.7000	2.0000	1.5000	1.5000	1.5000	1.5000	1.4000	1.4000	1.4000	2.2000	1.4000	1.4000	1.4000
DEPTH	25.0	95.5	1.0	10.0	25.0	99.0	1.0	10.0	25.0	102.0	1.0	10.0	25.0
PERMANENT STATION NO.	011	010	010	010	005	005	005	005	027	027	027	027	020
VALUE	1.9000	2.0000	2.0000	2.0000	1.6000	1.6000	1.6200	1.0900	1.2000	1.4000	2.3000	2.36[illegible]	1.6000
DEPTH	85.0	1.0	10.0	13.0	1.0	10.0	25.0	43.0	1.0	83.0	95.0	97.0	1.0
PERMANENT STATION NO.	020	020	020	035	035	035	034	034	034	034	033*	033*	033*
VALUE	1.6000	1.6000	1.6000	1.2500	1.2200	1.2200	1.5200	1.5300	2.0000	2.0000	1.3500	1.3500	2.6000
DEPTH	10.0	25.0	50.5	1.0	10.0	24.5	1.0	90.0	105.0	132.0	1.0	93.0	130.0
PERMANENT STATION NO.	026*	026*	026*	026*	025*	025*	025*	025*	024*	024*	024*	024*	023
VALUE	1.3000	1.3000	2.6300	2.6300	1.6000	1.6000	2.0000	2.9000	1.5000	1.5000	2.9000	2.9000	1.4000
DEPTH	1.0	80.0	110.0	119.0	1.0	74.0	100.0	132.0	1.0	76.0	99.0	110.0	1.0
PERMANENT STATION NO.	023	023	023	093	093	093	021	021	021	020	020	020	020
VALUE	1.4000	1.4000	1.0000	1.2000	1.2000	1.2000	2.3000	2.4000	2.4000	1.5000	1.5000	1.5000	1.6000
DEPTH	10.0	25.0	96.0	1.0	10.0	10.0	1.0	10.0	14.0	1.0	10.0	25.0	80.0
PERMANENT STATION NO.	019*	019*	019*	018	018	018	018	016	016	016	016	015*	015*
VALUE	1.4000	1.4000	2.6300	1.6700	1.6700	1.7000	1.7000	1.7000	1.7000	1.7200	1.7000	1.5300	1.5300
DEPTH	1.0	85.0	103.0	1.0	10.0	25.0	85.0	1.0	10.0	25.0	62.0	1.0	10.0
PERMANENT STATION NO.	015*	015*											
VALUE	1.5000	1.7300											
DEPTH	25.0	85.0											

CRUISE 7822003 ZONE NUMBER 11

PARAMETER T EB(184)

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	COLUMN
0.00	1.6069	126		0.		0.	1.6069	
1.00	1.6069	126	.213E+03	.2125E+03	.126E+03	.1258E+03		1.6069
5.00	1.6779	118	.821E+03	.1834E+04	.488E+03	.6148E+03	1.6825	1.6834
10.00	1.6667	113	.966E+03	.1999E+04	.578E+03	.1192E+04	1.6723	1.6700
20.00	1.6281	84	.162E+04	.3623E+04	.985E+03	.2177E+04	1.6483	1.6646
40.00		61						

THERE ARE 15 OBSERVATIONS AFFECTING CALCULATIONS IN ZONE 11

VALUES WITH A * ARE ACTUAL OBSERVATIONS IN THE ZONE

PERMANENT STATION NO.	857	857	857	853*	853*	853*	838*	838*	838*	837*	837*	837*	835*
VALUE	2.2000	2.2000	2.7000	1.0000	1.0000	2.0000	1.9000	1.9000	1.9000	1.9500	1.0000	1.0000	1.2500
DEPTH	1.0	10.0	12.0	1.0	10.0	24.0	1.0	10.0	17.0	1.0	10.0	21.0	1.0

PERMANENT STATION NO.	835*	835*
VALUE	1.2200	1.2200
DEPTH	10.0	24.5

CRUISE 7822083 ZONE NUMBER 12

PARAMETER T EB(184)

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	VOLUME WEIGHTED VALUES COLUMN
0.00	1.6841	61		0.		0.		
			.978E+02		.618E+02		1.6841	
1.00	1.6841	61		.9785E+02		.6180E+02		1.6841
			.379E+03		.236E+03		1.6841	
5.00	1.6841	57		.4764E+03		.2978E+03		1.6841
			.441E+03		.275E+03		1.6841	
10.00	1.6841	53		.9175E+03		.5728E+03		1.6841
			.732E+03		.490E+03		1.4937	
20.00	1.3771	45		.1649E+04		.1062E+04		1.5532
			.958E+03		.718E+03		1.3379	
40.00	1.2911	26		.2599E+04		.1772E+04		1.4669
			.111E+04		.875E+03		1.2739	
90.00	1.2500	9		.3714E+04		.2647E+04		1.4831
140.00		1						

THERE ARE 10 OBSERVATIONS AFFECTING CALCULATIONS IN ZONE 12

VALUES WITH A * ARE ACTUAL OBSERVATIONS IN THE ZONE

PERMANENT STATION NO.	858*	858*	858*	858*	856	856	856	856	807*	807*	807*	807*	857*
VALUE	1.3000	1.3000	1.3000	1.3000	1.2500	1.2500	1.2500	1.2500	1.5000	1.5000	1.5000	1.5000	2.2000
DEPTH	1.0	10.0	25.0	89.0	1.0	10.0	25.0	90.0	1.0	10.0	25.0	35.0	1.0

PERMANENT STATION NO.	857*	857*	853	853	853
VALUE	2.2000	2.7000	1.0000	1.0000	2.0000
DEPTH	10.0	12.0	1.0	10.0	24.0

CRUISE 7822083 ZONE NUMBER 13

PARAMETER T EB(184)

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	VOLUME WEIGHTED VALUES COLUMN
0.00	1.4533	66		0.		0.		
			.959E+02		.668E+02		1.4533	
1.00	1.4533	66		.9592E+02		.6680E+02		1.4533
			.378E+03		.260E+03		1.4533	
5.00	1.4533	64		.4738E+03		.3269E+03		1.4533
			.461E+03		.318E+03		1.4533	
10.00	1.4533	63		.9352E+03		.6435E+03		1.4533
			.829E+03		.570E+03		1.4546	
20.00	1.4568	51		.1764E+04		.1214E+04		1.4539
			.132E+04		.888E+03		1.4963	
40.00	1.5411	37		.3081E+04		.2094E+04		1.4717
			.145E+04		.185E+04		1.3765	
90.00	1.1000	5		.4526E+04		.3144E+04		1.4399

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	VOLUME WEIGHTED VALUES COLUMN
140.00	2.0213	0	.209E+03	.4736E+04	.125E+03	.3269E+04	1.6738	1.4489

THERE ARE 16 OBSERVATIONS AFFECTING CALCULATIONS IN ZONE 13

VALUES WITH A * ARE ACTUAL OBSERVATIONS IN THE ZONE

PERMANENT STATION NO.	895*	895*	895*	895*	894*	894*	894*	894*	859	859	859	859	858
VALUE	1.5200	1.5200	1.5300	1.6000	1.5000	1.5000	1.5000	1.6000	1.1000	1.1020	2.0000	2.9000	1.3000
DEPTH	1.0	10.0	25.0	41.0	1.0	10.0	25.0	49.0	1.0	103.0	130.0	177.0	1.0
PERMANENT STATION NO.	858	858	858										
VALUE	1.3000	1.2000	1.3000										
DEPTH	10.0	25.0	89.0										

CRUISE 7822003 ZONE NUMBER 14

PARAMETER T EB(184)

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	VOLUME WEIGHTED VALUES COLUMN
0.00	1.5304	135		0.		0.		
1.00	1.5304	135	.200E+03	.2077E+03	.135E+03	.1350E+03	1.5304	1.5304
5.00	1.5325	132	.820E+03	.1028E+04	.534E+03	.6698E+03	1.5355	1.5361
10.00	1.5250	124	.970E+03	.2006E+04	.640E+03	.1309E+04	1.5208	1.5325
20.00	1.2319	104	.150E+04	.3502E+04	.114E+04	.2449E+04	1.3827	1.4620
40.00	1.3874	79	.232E+04	.5903E+04	.183E+04	.4279E+04	1.2679	1.3795
90.00	1.2216	37	.368E+04	.9585E+04	.290E+04	.7179E+04	1.2697	1.3351
140.00	2.2481	12	.201E+04	.1160E+05	.123E+04	.8484E+04	1.6442	1.3882
150.00	2.4778	8	.235E+03	.1183E+05	.188E+03	.8584E+04	2.3518	1.3916
175.00	2.7778	1	.291E+03	.1213E+05	.113E+03	.8617E+04	2.5089	1.4872

THERE ARE 34 OBSERVATIONS AFFECTING CALCULATIONS IN ZONE 14

VALUES WITH A * ARE ACTUAL OBSERVATIONS IN THE ZONE

PERMANENT STATION NO.	888	888	888	888	872*	872*	872*	872*	871*	871*	871*	870	870
VALUE	1.2500	1.2000	1.2500	1.6000	1.2000	1.2000	1.2000	1.5000	2.3000	2.2500	2.2500	1.1000	1.1000
DEPTH	1.0	10.0	25.0	74.0	1.0	10.0	25.0	107.0	1.0	10.0	12.0	1.0	94.0
PERMANENT STATION NO.	870	870	868	868	868	868	867*	867*	867*	867*	866*	866*	866*
VALUE	2.7000	2.7000	1.0000	.9700	2.7200	2.0300	1.3000	1.2000	1.2600	1.6700	2.0000	2.0000	2.0000
DEPTH	160.0	167.0	1.0	184.0	154.0	194.0	1.0	10.0	25.0	78.0	1.0	10.0	17.0
PERMANENT STATION NO.	895	895	895	895	865	865	865	865					
VALUE	1.5200	1.5200	1.5300	1.6000	1.1900	1.2500	2.0000	2.4000					
DEPTH	1.0	10.0	25.0	41.0	1.0	97.0	112.0	151.0					

CRUISE 7822803 ZONE NUMBER 15

PARAMETER T EB(184)

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	VOLUME WEIGHTED VALUES COLUMN
0.00	1.0076	198		0.		0.	1.0076	
1.00	1.0076	198	.215E+03	.215E+03	.198E+03	.198E+03	1.0755	1.0076
5.00	1.0630	185	.824E+03	.1039E+04	.784E+03	.976E+03	1.0478	1.0788
10.00	1.0323	175	.943E+03	.1982E+04	.908E+03	.1864E+04	1.0303	1.0634
20.00	1.0447	150	.169E+04	.3670E+04	.163E+04	.3489E+04	1.1997	1.0517
40.00	1.3919	77	.272E+04	.6393E+04	.227E+04	.5759E+04		1.1188
90.00		15						

THERE ARE 23 OBSERVATIONS AFFECTING CALCULATIONS IN ZONE 15

VALUES WITH A * ARE ACTUAL OBSERVATIONS IN THE ZONE

PERMANENT STATION NO.	877	877	877	877	875*	875*	875*	874	874	874	874	889*	889*
VALUE	.4000	.4000	.4000	.4000	.2000	.2000	.2000	1.2000	1.1000	1.1000	1.1000	1.2000	1.2000
DEPTH	1.0	10.0	25.0	20.0	1.0	10.0	25.0	1.0	10.0	25.0	67.0	1.0	10.0
PERMANENT STATION NO.	889*	889*	873*	873*	873*	873*	888*	888*	888*	888*			
VALUE	1.2000	1.7000	1.6000	1.3000	1.3000	1.3000	1.2500	1.2000	1.2500	1.0000			
DEPTH	25.0	82.0	1.0	10.0	25.0	30.5	1.0	10.0	25.0	74.0			

CRUISE 7822803 ZONE NUMBER 16

PARAMETER T EB(184)

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	VOLUME WEIGHTED VALUES COLUMN
0.00	.2000	49		0.		0.	.3000	
1.00	.3000	49	.147E+02	.147E+02	.49E+02	.49E+02	.2996	.3000
5.00	.2991	31	.479E+02	.626E+02	.168E+03	.218E+03	.2985	.2997
10.00	.2980	25	.418E+02	.1044E+03	.148E+03	.365E+03	.2852	.2992
20.00	.2667	7	.456E+02	.1501E+03	.168E+03	.533E+03		.2948

THERE ARE 6 OBSERVATIONS AFFECTING CALCULATIONS IN ZONE 16

VALUES WITH A * ARE ACTUAL OBSERVATIONS IN THE ZONE

PERMANENT STATION NO.	898	898	898	875	875	875
VALUE	.3000	.3000	.3000	.3000	.2000	.3000
DEPTH	1.0	10.0	17.0	1.0	10.0	25.0

CRUISE 7822803 ZONE NUMBER 17

PARAMETER T EB(184)

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	VOLUME WEIGHTED VALUES COLUMN
0.00	1.2359	2285		0.		0.		

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	VOLUME WEIGHTED VALUES COLUMN
1.00	1.2359	2285	.282E+04	.2824E+04	.229E+04	.2285E+04	1.2359	1.2359
5.00	1.2330	2285	.113E+05	.1411E+05	.914E+04	.1143E+05	1.2349	1.2351
10.00	1.2309	2280	.141E+05	.2817E+05	.114E+05	.2284E+05	1.2323	1.2337
20.00	1.2198	2266	.278E+05	.5682E+05	.227E+05	.4557E+05	1.2249	1.2293
40.00	1.2549	2219	.555E+05	.1115E+06	.449E+05	.9042E+05	1.2369	1.2391
90.00	1.2328	1717	.122E+06	.2339E+06	.984E+05	.1888E+06	1.2448	1.2387
145.00	2.5354	1182	.129E+06	.3633E+06	.785E+05	.2993E+06	1.8963	1.4812
150.00	2.6680	942	.266E+05	.3899E+06	.182E+05	.2695E+06	2.6888	1.4486
175.00	2.8641	414	.467E+05	.4366E+06	.170E+05	.2865E+06	2.7533	1.5239
200.00	2.8180	136	.195E+05	.4561E+06	.680E+04	.2933E+06	2.8416	1.5548
210.00	2.8600	68	.289E+04	.4590E+06	.182E+04	.2944E+06	2.8322	1.5592
218.00	2.8688	68	0.	.4590E+06	0.	.2944E+06	I	1.5592
225.00		9		.4590E+06		.2944E+06		1.5592

THERE ARE 175 OBSERVATIONS AFFECTING CALCULATIONS IN ZONE 17

VALUES WITH A * ARE ACTUAL OBSERVATIONS IN THE ZONE

PERMANENT STATION NO.	328	828	828	828	830	830	830	830	832*	832*	832*	832*	831
VALUE	1.6000	1.6000	1.6000	1.6000	1.9000	1.9000	1.9000	1.9000	1.5000	1.5000	1.8000	1.6000	2.3000
DEPTH	1.0	10.0	25.0	58.5	1.0	10.0	25.0	40.0	1.0	10.0	25.0	73.0	1.0
PERMANENT STATION NO.	831	831	891	891	891	842*	842*	842*	842*	841*	841*	841*	841*
VALUE	2.3000	2.3000	2.2000	2.2000	2.2000	1.5000	1.5000	1.5000	1.6000	1.1000	1.1000	1.1000	1.3000
DEPTH	10.0	10.0	1.0	10.0	16.5	1.0	10.0	25.0	63.0	1.0	10.0	25.0	121.0
PERMANENT STATION NO.	844	844	844	844	845*	845*	845*	845*	846	846	846	846	848
VALUE	1.7000	1.7000	1.7000	1.6000	1.2000	1.2000	1.3000	1.6000	1.7000	1.7000	1.7000	1.9000	1.3300
DEPTH	1.0	10.0	25.0	44.5	1.0	10.0	25.0	76.0	1.0	10.0	25.0	45.0	1.0
PERMANENT STATION NO.	848	848	849*	849*	849*	849*	861*	861*	861*	861*	863*	863*	863*
VALUE	1.3300	1.3300	1.4000	1.4000	1.4200	1.4200	1.2000	1.2000	1.3000	1.6700	.8000	.7000	.7700
DEPTH	10.0	20.0	1.0	10.0	25.0	40.0	1.0	10.0	25.0	42.0	1.0	10.0	25.0
PERMANENT STATION NO.	863*	862	862	884*	884*	884*	884*	881	881	881	881	877	877
VALUE	.9700	1.4000	1.4000	1.1000	1.1000	1.0000	1.0000	.9200	.9100	.9400	1.0200	.4000	.4000
DEPTH	83.0	1.0	9.5	1.0	10.0	25.0	36.0	1.0	10.0	25.0	54.0	1.0	10.0
PERMANENT STATION NO.	877	877	875	875	875	874*	874*	874*	874*	889	889	889	889
VALUE	.4000	.4000	.3000	.2000	.3000	1.2000	1.1000	1.1000	1.1000	1.3000	1.2000	1.2000	1.7000
DEPTH	25.0	28.0	1.0	10.0	25.0	1.0	10.0	25.0	67.0	1.0	10.0	25.0	82.0
PERMANENT STATION NO.	888	888	888	888	872	872	872	872	878*	878*	878*	878*	869*
VALUE	1.2500	1.2000	1.2500	1.0000	1.2000	1.2000	1.2000	1.5000	1.1000	1.1000	2.7000	2.7000	.6000
DEPTH	1.0	10.0	25.0	74.0	1.0	10.0	25.0	107.0	1.0	94.0	160.0	167.0	1.0
PERMANENT STATION NO.	869*	869*	869*	868*	868*	868*	868*	867	867	867	867	895	895
VALUE	.7500	2.7000	2.7000	1.0000	.9700	2.7200	2.8300	1.3000	1.2000	1.2600	1.6700	1.5200	1.5200
DEPTH	84.0	154.0	173.0	1.0	184.0	154.0	194.0	1.0	10.0	25.0	78.0	1.0	10.0
PERMANENT STATION NO.	895	895	865*	865*	865*	865*	864*	864*	864*	864*	864*	868*	868*
VALUE	1.5300	1.6000	1.1900	1.2500	2.0000	2.4000	.9000	1.0000	2.6000	2.5000	1.0000	1.0000	2.5300
DEPTH	25.0	41.0	1.0	97.0	112.0	151.0	1.0	114.0	150.0	210.0	1.0	84.0	155.0

PERMANENT STATION NO.	894	894	894	894	859*	859*	859*	859*	855*	855*	855*	855*	858
VALUE	1.5000	1.5000	1.5000	1.6000	1.1000	1.1000	2.0000	2.9000	1.1000	1.1000	2.0000	2.0000	1.3000
DEPTH	1.0	10.0	25.0	49.0	1.0	103.0	130.0	177.0	1.0	98.0	140.0	183.0	1.0
PERMANENT STATION NO.	858	858	858	856*	856*	856*	856*	854*	854*	854*	854*	853	853
VALUE	1.3000	1.3000	1.3000	1.2500	1.2500	1.2500	1.2500	1.2000	1.2000	3.0000	3.0000	1.0000	1.0000
DEPTH	10.0	25.0	89.0	1.0	10.0	25.0	90.0	1.0	97.0	121.0	146.0	1.0	10.0
PERMANENT STATION NO.	853	852*	852*	852*	838	838	838	839*	839*	839*	839*	840*	840*
VALUE	2.0000	1.2000	1.2500	2.6200	1.9000	1.9000	1.9000	1.3000	1.3000	2.7000	2.7000	1.3000	1.3200
DEPTH	24.0	1.0	87.0	118.0	1.0	10.0	17.0	1.0	96.0	120.0	140.0	1.0	100.0
PERMANENT STATION NO.	840*	840*	836*	836*	836*	836*	837	837	837	835	835	835	834*
VALUE	3.0300	3.0700	1.3000	1.3000	2.0000	2.0000	1.8500	1.8000	1.8000	1.2500	1.2200	1.2200	1.5200
DEPTH	140.0	170.0	1.0	99.0	142.0	150.0	1.0	10.0	21.0	1.0	10.0	24.5	1.0
PERMANENT STATION NO.	834*	834*	834*	833	833	833							
VALUE	1.5300	2.0000	2.0000	1.3500	1.3500	2.6000							
DEPTH	90.0	105.0	132.0	1.0	93.0	130.0							

CRUISE 7022003 ZONE NUMBER 25

PARAMETER T EB(104)

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	VOLUME WEIGHTED VALUES COLUMN
0.00	1.3467	4621		0.		0.		
1.00	1.3467	4621	.622E+04	.6223E+04	.462E+04	.4621E+04	1.3467	1.3467
5.00	1.3465	4495	.246E+05	.3077E+05	.182E+05	.2285E+05	1.3466	1.3466
10.00	1.3367	4376	.298E+05	.6053E+05	.222E+05	.4503E+05	1.3416	1.3441
20.00	1.2998	4016	.553E+05	.1159E+06	.420E+05	.8699E+05	1.3185	1.3318
40.00	1.3586	3374	.979E+05	.2137E+06	.739E+05	.1609E+06	1.3245	1.3284
90.00	1.3728	2260	.192E+06	.4054E+06	.141E+06	.3017E+06	1.3606	1.3435
140.00	2.5322	1142	.161E+06	.5668E+06	.851E+05	.3868E+06	1.8886	1.4633
150.00	2.6664	950	.272E+05	.5932E+06	.105E+06	.3973E+06	2.5972	1.4932
175.00	2.8639	415	.470E+05	.6401E+06	.171E+05	.4143E+06	2.7522	1.5450
200.00	2.8100	136	.196E+05	.6597E+06	.689E+04	.4212E+06	2.8415	1.5662
210.00	2.8600	68	.289E+04	.6626E+06	.102E+04	.4222E+06	2.8322	1.5693
210.00	2.8600	68	0.	.6626E+06	0.	.4222E+06	I	1.5693
225.00		9						

THE ZONES NOT INCLUDED ARE 8,

1978 LAKE ONTARIO PARAMETER: T EB (104)
DEPTH: 1.0

CRUISE	7822003	
CRUISE DATES	78/04/10. TO 78/04/14.	
1	.6727	
2	1.2438	
3	1.4873	
4	1.9583	
5	1.8253	
6	1.7494	
7	1.9470	
9	1.8230	
10	1.4686	
11	1.6869	
12	1.6041	
13	1.4533	
14	1.5384	
15	1.0876	
16	.3000	
17	1.2359	
25	1.3467	
17 20.M	1.2190	
40.M	1.2549	
BOTTOM	2.8600	
25 20.M	1.2998	
40.M	1.3506	
BOTTOM	2.8600	

Environnement Canada Environment Canada

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M. Neilson, R. Stevens et J. Hodson

ÉTUDE N° 130, COLLECTION DES RAPPORTS TECHNIQUES

DIRECTION GÉNÉRALE DES EAUX INTÉRIEURES
RÉGION DE L'ONTARIO
DIRECTION DE LA QUALITÉ DES EAUX
BURLINGTON (ONTARIO), 1984

(Available in English on request)

Canada

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Résumé

Le programme ALDAR (Averaging Lake DAta by Regions/établissement de moyennes régionalisées par zones, des paramètres lacustres) rend possible la réduction, à un niveau qui en permet la gestion, de la masse de données saisies dans des stations fixes et par des expéditions sur un lac. Il produit un état récapitulatif de chaque paramètre pour chaque expédition. Il comprend : les valeurs interpolées, à chaque station et à toute profondeur donnée; la moyenne pondérée selon la surface, à des profondeurs particulières de zones données et de l'ensemble du lac; les valeurs réelles, qui influent sur chaque zone, et la profondeur et la station où chacune a été enregistrée; les valeurs pondérées selon le volume, par zone et pour l'ensemble du lac, non seulement à chaque intervalle successif de profondeur, mais aussi pour la couche allant de la surface à chaque profondeur; et un état récapitulatif des moyennes en surface (1 m) pondérées selon la surface pour toutes les zones et pour l'ensemble du lac, plus, sur demande, des données supplémentaires en profondeur pour l'ensemble du lac et une autre zone. Ce programme a aidé à comparer les différentes zones lacustres et à étudier les tendances temporelles.

Abstract

The program ALDAR (Averaging Lake DAta by Regions) was developed to reduce to a manageable level the large amounts of data produced by a station- and cruise-oriented monitoring program. The program provides the user with a cruise summary for each parameter. Included in the output are interpolated parameter values, at each station, for any specified depth; area-weighted mean values, at specified depths, for designated regions (zones) and the entire lake; the actual parameter values influencing each region, and the depth and station at which each was recorded; volume-weighted values of the parameter by zone and for the entire lake, not only for each successive depth interval but also for the layer extending from the surface to each depth; and a summary report of the area-weighted mean surface (1 m) values for all the zones and the entire lake plus additional depth data for the whole lake and one other zone if requested. This program has been instrumental in comparing regions of the lake and studying time trends.

Documentation du programme ALDAR (Averaging Lake Data by Regions — Établissement de moyennes régionalisées des paramètres lacustres)

M. Neilson, R. Stevens et J. Hodson

INTRODUCTION

Avec l'expansion des activités de surveillance sur les Grands lacs, il s'est révélé nécessaire de trouver des moyens efficaces pour faciliter l'interprétation de l'énorme quantité de données établies dans le cadre de ce programme, par les nombreuses stations et au cours de multiples expéditions. Il a été admis que, pour pouvoir suivre les tendances des variables mesurées, il fallait essayer de fournir un nombre simple ou une quantité représentative du lac dans son ensemble. Pour atteindre cet objectif, le programme informatique ALDAR (Établissement de moyennes régionalisées des paramètres lacustres) a été créé en juillet 1975 par N. Knight, R. Gottinger et E.B. Bennett. Ce rapport est un résumé detaillé des fonctions du programme et de son mode d'exploitation. Il est destiné à répondre aux questions le plus souvent posées par les utilisateurs du programme et des résumés de données.

Comme son nom le laisse entendre, le programme ALDAR est basé sur un schéma de zonage ou de régionalisation défini par l'utilisateur pour le lac. Une telle notion de régionalisation permet à l'utilisateur de manipuler les données, non seulement pour le lac dans son ensemble, mais également en ce qui concerne des régions particulières du lac, sans compter la segmentation verticale. Aux profondeurs indiquées, le programme ALDAR produit un résumé de l'expédition pour chaque paramètre, fournissant à l'utilisateur les informations suivantes :

(1) Les valeurs des paramètres observés influant sur chaque zone, de même que la profondeur et le point d'enregistrement de ces valeurs

(2) Pour chaque station échantillonnée, les concentrations des paramètres ont été interpolées en fonction des profondeurs (indiquées)

(3) La superficie des zones et du lac dans son ensemble à différentes profondeurs standard

(4) Les valeurs moyennes pondérées selon la surface pour chaque zone et pour le lac dans son ensemble, à chaque profondeur donnée

(5) Les valeurs moyennes pondérées selon le volume à la fois à partir de la surface jusqu'à une profondeur donnée (colonne) et entre deux profondeurs quelconques (couche) pour chaque zone et pour le lac dans son ensemble

(6) La quantité du paramètre, pour les valeurs de la colonne et des couches, pour toutes les zones et tout le lac.

PROGRAMME ALDAR

Régionalisation du lac

Comment fonctionne le programme? Chaque lac est divisé en un réseau quadrillé de 2 km, 4 km ou 8 km de dimensions, la profondeur moyenne de chaque case ayant été calculée à partir des profils bathymétriques du lac (Robertson et Jordan, 1978).[1] Les cases sont ensuite affectées aux zones, selon les indications de l'utilisateur (voir fig. 1), ce qui permet de créer un fichier sur la bathymétrie zonée, lequel est ensuite utilisé par le programme.

---

[1] Remarque : Une profondeur nulle est attribuée à la terre.

Calculs

Les données obtenues à chaque expédition sont introduites dans la base de données STAR (STorage And Retrieval—Mémorisation et Extraction) selon la date et la station. La latitude et la longitude sont ensuite converties en coordonnées x et y en kilomètres, selon la formule élaborée par Rodgers (1969), situant ainsi les stations sur la carte quadrillée. Aux profondeurs standard indiquées par l'utilisateur (D_i), les concentrations des paramètres (C_i) sont calculées au moyen d'une simple interpolation linéaire. Lorsque D se trouve entre D_0 et D_i, C peut être calculé comme suit :

$$C = C_0 + (D - D_0)\frac{\Delta C}{\Delta D}$$

où $\Delta C = C_i - C_0$ et $\Delta D = D_i - D_0$. Pour chaque paramètre, le programme ALDAR associe par la suite une station à chacune des cases du réseau situé à proximité. Cette association station-case du réseau changera en fonction de la fréquence d'échantillonnage des paramètres, comme l'indique la figure 2. Les valeurs des paramètres observées/calculées pour une station sont attribuées à toutes les cases du réseau associées à cette station. La moyenne des cases de chaque zone est utilisée pour donner une moyenne pondérée selon la superficie. Le calcul de la moyenne de la surface verticale donne la moyenne pondérée selon le volume.

État récapitulatif

Après le traitement de chaque paramètre, un état récapitulatif est compilé, présentant sous forme de tableau les valeurs moyennes pondérées selon une superficie d'un mètre pour chaque zone et pour tout le lac (= zone 25). En outre, l'utilisateur peut indiquer jusqu'à cinq profondeurs additionnelles pour la zone 25 et une autre zone qui peut être incluse dans l'état récapitulatif. Les informations contenues dans l'état récapitulatif sont ajoutées à la fin du fichier permanent à accès direct ALDREPS que l'utilisateur doit constituer. Ce fichier peut être lu par le programme ALDSUM pour produire les états récapitulatifs des paramètres obtenus lors des nombreuses expéditions.

CARTE DE LA BATHYMÉTRIE ZONÉE

L'utilisateur constitue le fichier de la bathymétrie zonée (fig. 1) pour refléter le schéma voulu des zones à l'aide du programme ZØNSEL. Dans la définition des zones, chaque carte représente une ligne, commençant au fond du lac. Les cartes sont lues comme suit :

Colonne(s) 1-4	Premier numéro de zone se trouvant sur la ligne.
5-8	Dernier numéro de la case sur la ligne appartenant à cette zone.
9-12	Deuxième numéro de zone se trouvant sur la ligne.
13-16	Dernier numéro de case sur la ligne appartenant à cette zone, répété pour toutes les zones de la ligne.
77-80	Numéro de la ligne de la carte quadrillée.

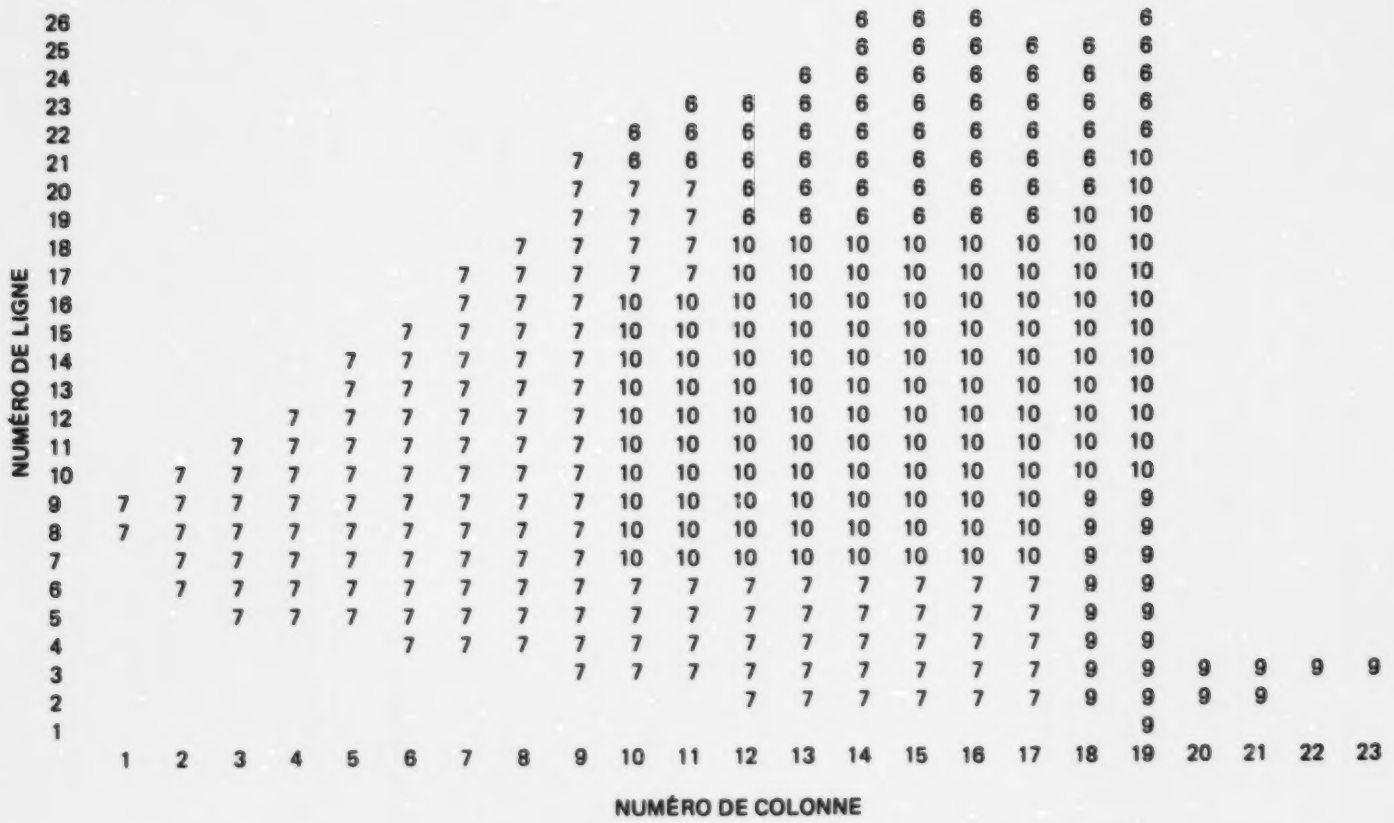


Figure 1. Carte de la bathymétrie zonée pour l'extrémité ouest du lac Ontario.

Affectation des cases du quadrillage de station pour le paramètre A, échantillonné aux stations 16, 18, 20, 21, 22 et 86 :

			18	18	18	20	**20**	21	21	21				
	16	18	18	18	18	20	20	21	21	21	21	21	22	22
16	16	18	**18**	18	18	86	86	21	21	**21**	21	21	22	**22**
16	16	16	18	18	86	86	86	86	21	21	21	21	22	
16	16	16	17	17	17	**86**	86	86	86					

Changements d'affectation des cases du quadrillage de station pour le paramètre B, échantillonné seulement aux stations 18, 20 et 22 :

			18	18	18	20	**20**	20	20	20	22			
			18	18	18	20	20	20	20	20	22	22	22	22
18	18	18	**18**	18	18	20	20	20	20	20	22	22	22	**22**
18	18	18	18	18	18	18	20	20	20	22	22	22	22	
18	18	18	18	18	18	18	20	20	20					

n Emplacement réel de la station n

n Station n affectée à cette case du quadrillage

Figure 2. Les stations sont affectées aux cases du quadrillage sur une base paramétrique.

DOCUMENTATION ALDAR

Ligne(s)	Description
24-104	Constitue les schémas pour la base de données S2K STAR.
111-262	Connecte la base de données et satisfait aux exigences du travail présenté; enregistre l'année et l'expédition voulues, les codes des paramètres nécessaires, les zones à exclure et les profondeurs standard qui serviront à l'intégration; vérifie les limites des tableaux; établit la carte bathymétrique; fixe les constantes pour la localisation des stations sur la carte bathymétrique.
113	Lit d'après les données en entrée de l'utilisateur (présentées sur cartes ou par télésoumission par lots) les caractéristiques de la base de données (mot de passe, nom, emplacement); appelle les blocs correspondants et lit la base de données.
135	Enregistre les numéros de paramètres nécessaires et, dans chaque zone, les observations réelles si elles doivent être imprimées.
139	Écrit sur la sortie le titre («ALDAR») et le numéro de code des paramètres; entreprend l'enregistrement si les observations réelles doivent être imprimées.
148	Lit les zones qui doivent être exclues de ce passage.
151	Imprime sur la sortie les zones exclues.
155	Lit le nom du lac sur la bande TAPE30 (le fichier de bathymétrie zonée); les nombres de lignes, de colonnes, la taille des cases sur la carte bathymétrique et le nombre de zones du lac.
159	Enregistre les données en entrée portant sur les profondeurs standard (en mètres) qui doivent servir à la pondération selon la profondeur.
165	Compte le nombre de profondeurs standard (KDM) (jusqu'à 20 profondeurs) et les liste sur la sortie.
175	S'assure par une vérification que le nombre de zones est inférieur à 25, que le nombre de lignes dans le fichier bathymétrique est inférieur à 300 et que la liste de paramètres ne dépasse pas 50 codes.
186	Lit le numéro de référence de l'expédition et l'année de l'expédition voulue.
193	Appelle le sous-programme LIBRARY qui lit la liste des codes contenant tous les codes de chaque année. Le programme ALDAR enregistre ensuite les codes spécifiés des paramètres provenant des données en entrée de l'utilisateur et extrait le nombre de décimales et les noms de codes abrégés pour chaque code. *Remarque* : I est un compteur de code, ICØDE (I) est la liste des codes pour l'année, INCØDE (I) est la liste spécifiée des codes pour ce passage.
203	Sur la sortie, liste les codes de paramètre pour ce passage.
214	Appelle ZERØV qui crée une rangée de zéros; définit IPØS qui compte les numéros de code.
218	Appelle le sous-programme CØN1 qui localise les numéros de code indiqués au moyen d'une recherche binaire.

223 Extrait à partir des données en entrée les zones et les profondeurs indiquées pour l'état récapitulatif et les imprime sur la sortie.

247 Valide l'expédition et situe les stations pour l'expédition.

257 Appelle le sous-programme SELECT qui extrait le lac voulu et fixe les constantes pour situer l'emplacement des stations par rapport au quadrillage (les constantes sont utilisées dans les équations des lignes 305 et 306).

262 Appelle le sous-programme BATHY.

Sous-programme BATHY

Ce sous-programme signale la zone à laquelle appartient chaque case du lac, la profondeur moyenne de chaque case et détermine, à chaque profondeur standard, le nombre de cases dans chaque zone.

Ligne(s)	Description
14	Interconnecte TAPE30, le fichier de la bathymétrie zonée, lisant IZBØ : IZBØ est constitué de $\frac{\text{zone - profondeur}}{\text{numéro de zone}}$ pour la case N.
19	Définit IXBØ comme la profondeur (nombre entier) de la case N. *Exemple 1* IXBØ = MOD (IZBØ, 1000) $= IZBØ - \frac{(IZBØ)}{1000} 1000$ = 17124* − 17000 = 124 *IZBØ = 17124, c'est-à-dire, la zone de la case = 17, la profondeur de la case = 124
23	Convertit le nombre entier en profondeur réelle.
27	Définit NC comme la zone de la case (= NØ (J)). *Exemple 2* NC = IZBØ/1000 NC = 17124/1000 = 17 *Remarque* : Si IXBØ = 0, cette case se rapporte à la terre et elle est affectée à la zone 0 (ligne 21).
34	Si la zone de la case, NC, correspond à KØUT, une zone à éliminer, selon les indications de l'utilisateur, ce numéro de zone est remis à 0 (NØ (J) = 0).
42	Pour toutes les zones non éliminées, détermine le nombre de cases à chaque profondeur standard (NHYP) dans chaque zone.

Pour la zone NC, selon la profondeur standard : si la profondeur de la case (ZW) est inférieure à la profondeur standard (KD), elle est exclue pour le reste des profondeurs standard; toutefois, si elle est supérieure à la profondeur ou égale à celle-ci, le nombre de cases pour la zone NC (NHYP (KD, NC)) augmente de 1 et il en est de même pour NHYP pour la zone 25 (le lac entier) qui augmente de 1.

51 Les zones pour chaque case sont enregistrées sur TAPE35.

54 Retourne à ALDAR.

ALDAR (suite)

Ligne(s)	Description
265-395	ALDAR traite une station à la fois. Localise les stations sur la carte de la bathymétrie zonée. Extrait les données EBT et toutes les valeurs des paramètres pour toutes les profondeurs (pour cette station) et enregistre les informations dans PAR (TAPE1). Continue jusqu'à ce que toutes les données de toutes les stations soient enregistrées sur TAPE1.
294	DDDMMSS de latitude et de longitude sont convertis en fraction en divisant les minutes par 60 et les secondes par 3600.
303	À l'aide de la référence commençant par la latitude et la longitude, et des constantes du lac désignées dans le sous-programme SELECT, les indices X et Y de la station (en kilomètres) pour localiser les stations sur la carte quadrillée sont déterminés.
308	Définit IS et JS comme les coordonnées sur la carte quadrillée, en tenant compte de la taille des cases.

Exemple 3

Station 39

latitude 43°29'12", longitude 78°00'00"

XLAT = 43.4867 XLØNG = 78.0000

de SELECT, G = 1.82

P = .322

X = 148.0 km Y = 34.2 km

$$IS = \left(X + \frac{\text{taille de la grille}}{2}\right)/\text{taille de la grille} = 74.5$$

$$JS = \left(Y + \frac{\text{taille de la grille}}{2}\right)/\text{taille de la grille} = 17.5$$

} coordonnées exactes de la grille

315 Lit TAPE35, les zones associées à chaque grille.

Remarque : Si la zone de la case = 0, cette case est mise de côté pour le reste de cette procédure.

321 Définit XSTAT (LIN), YSTAT (LIN) et ACTST (LIN) pour mémoriser les coordonnées x et y et PSN pour la station (LIN)th.

334 Si le programme n'est pas exécuté pour les données EBT, passe à la ligne 347; si seulement EBT (code 100 ou 104) est voulu, extrait les données EBT; T(J) et Z(J) sont respectivement les valeurs de la température et de la profondeur, numérisées en 9 points, pour la profondeur Jth.

356 Extrait les codes de C102 et les enregistre dans NCØDE; ICD est un compteur de codes.

363 Le tableau PAR contient toutes les données pour toutes les profondeurs, tous les paramètres. Il est disposé de sorte que la colonne 1 contient les profondeurs d'échantillonnage réelles (en mètres); les autres valeurs des codes sont enregistrées dans les colonnes suivantes.

Exemple 4

Station 014

Profondeur	Température	DO_2	pH
1.0	51.8	12.53	7.98
10.0	5.18	12.55	7.95
20.0	–	–	–
25.0	5.18	12.58	7.93
87.5	5.06	12.68	7.90
95.5	5.04	12.39	7.88

Ces données seront enregistrées dans PAR comme suit :

colonne 1 (=PROFONDEURS)	colonne 2 (=TEMP)	colonne 3 (=DO2)	colonne 4 (=PH)
1.0	5.18	12.53	7.98
10.0	5.18	12.55	7.95
20.0	- 1.0	-1.0	- 1.0
25.0	5.18	12.58	7.93
87.5	5.06	12.68	7.90
95.5	5.04	12.39	7.88
- 1.0	- 1.0	-1.0	- 1.0

Remarque : Une valeur de (-1.0) signifie qu'il n'y a pas de données.

Jusqu'à présent, toutes les données sur la profondeur et les paramètres d'une seule station sont enregistrées dans PAR. Si les données EBT seulement sont nécessaires, elles sont transférées au tableau PAR. Si les données EBT ne sont pas accessibles, les valeurs de la profondeur et de la température de la station sont toutefois utilisées.

Si les données EBT sont accessibles pour la station et sont demandées :

Ligne(s) **Description**

386 Affecte respectivement aux colonnes 1 et 2 de PAR les mêmes valeurs de profondeur (Z (J)) et de température (T (J)) que la numération en 9 points de EBT.

395	Le numéro de station permanente et toutes les valeurs de profondeur-paramètres pour cette station sont enregistrés sur TAPE1.
397	Ce processus se poursuit de manière à enregistrer les données de toutes les stations sur TAPE1.
403-427	ALDAR traite un paramètre à la fois. Imprime le nom du paramètre et le numéro de code sur la sortie et liste les profondeurs standard. Rebobine TAPE35 qui contient le numéro de zone associé à chaque case du quadrillage du lac et TAPE36 qui contiendra le numéro de station associé à chaque case.
431	Appelle le sous-programme REPØRT.

Sous-programme REPØRT

Le sous-programme REPØRT appelle un autre sous-programme, INTRPØL, qui calcule les valeurs interpolées des paramètres à chacune des profondeurs standard précisées par l'utilisateur. Le sous-programme REPØRT liste ensuite sur la sortie, ces valeurs, par station permanente. Les informations sont enregistrées sur TAPE2 dans le tableau TH. Noter que le programme traite toujours un paramètre à la fois.

Ligne(s)	Description
12	Crée le tableau TH (profondeur standard, PSN) qui doit enregistrer les valeurs interpolées du paramètre à des profondeurs standard. Met tous les éléments à (-1.0).
23	Lit TAPE1 qui enregistre les observations réelles et les profondeurs d'échantillonnage.
29	Traite une station à la fois.
30	Appelle le sous-programme INTRPØL.

Sous-programme INTRPØL

Ligne(s)	Description
15	Appelle ZERØV et met à zero les tableaux PARAM (observations réelles des paramètres) et DEP (profondeurs d'échantillonnage réel).
18	Rappelle qu'une valeur de (-1.0) signifie qu'il n'y a pas de données; ainsi, le programme passe à la profondeur suivante.
20	S'il existe des données pour cette profondeur, enregistre la valeur du paramètre dans le tableau PARAM et la profondeur d'échantillonnage dans le tableau DEP.
23	Indique que la ligne 1 du tableau TH constitue les valeurs du premier paramètre.
28	Enregistre sur TAPE2 le compteur de station, la valeur des paramètres observés et les profondeurs d'échantillonnage correspondantes.
33	S'il y a seulement une profondeur d'échantillonnage (N = 1) et que le numéro de code = 124, 225, 267, 613 ou 614 (tous les paramètres intégrés), revenir à REPØRT (c'est-à-dire ne pas interpoler).

39 S'il n'y a qu'une profondeur d'échantillonnage et s'il n'y a pas l'un des numéros de code mentionnés ci-dessus, DEP(2) = DEP(1) et les deux paramètres ont des valeurs égales, PARAM(2) = PARAM(1).

51 Calcule les valeurs interpolées pour le paramètre, IP, à des profondeurs standard, L.

Cas (i) La profondeur d'échantillonnage est égale à la profondeur standard

—TH prend la valeur de PARAM.

—Retourne sur une boucle et L augmente de 1.

Cas (ii) La profondeur d'échantillonnage est inférieure à la profondeur standard (L < KDM)

—Retourne sur une boucle et la profondeur d'échantillonnage le numéro J augmente de 1.

Cas (iii) La profondeur d'échantillonnage est inférieure à la profondeur standard (L = KDM)

—TH pour cette station à cette profondeur = -1.0.

—Le nombre des profondeurs pour cette station diminue de 1.

—Retourne à REPØRT.

Cas (iv) La profondeur d'échantillonnage est supérieure à la profondeur standard

—TH pour cette station (IN) à la profondeur L est redéfini comme suit :

$$TH(L,IN) = PARAM(J-1) + \frac{(PARAM(J)-PARAM(J-1)) \times (DEPTH(L)-DEP(J-1))}{DEP(J)-DEP(J-1)}$$

Exemple 5

J	PROFONDEUR D'ÉCHANTILLONNAGE	VALEUR OBSERVÉE	L	PROFONDEUR STANDARD	VALEUR (TH) CALCULÉE
1	1.0	2.5	2	1.0	(a)
2	5.0	2.0			
			3	10.0	(b)
3	15.0	1.4			

(a) Comme dans le cas (i) la profondeur d'échantillonnage est égale à la profondeur standard TH (2,IN) = PARAM(1) = 2.5

(b) Comme dans le cas (iv), TH (3,IN) est redéfini :

$$TH(3,IN) = 2.0 + \frac{(1.4-2.0)(10.0-5.0)}{15.0-5.0} = 1.7$$

66 Lorsque des valeurs ont été affectées à toutes les profondeurs standard pour ce paramètre et cette station, le programme retourne au sous-programme REPØRT.

Sous-programme REPØRT (suite)

Ligne(s)	Description
35	Si cette station a des données pour ce paramètre, NSTP affecte un numéro consécutif (INP) à la station.
39	Si uniquement les données EBT sont demandées (NUMPAR=1), le premier (et le seul) numéro de code (doit être 100 ou 104) est affecté à IC.
42, 49	Sur la sortie, imprime les valeurs des paramètres interpolés et des PSN aux profondeurs standard pour toutes les stations (pour un seul paramètre).
45	Les numéros de code des divers paramètres (IP) sont affectés à IC.
46	Prend des dispositions pour les valeurs exponentielles.
44, 50, 53	Tourne continuellement sur une boucle jusqu'à ce que toutes les stations soient traitées. TAPE2 contient maintenant les valeurs des paramètres interpolés aux profondeurs standard pour toutes les stations (pour un paramètre seulement).
60	Retourne à ALDAR.

ALDAR (suite)

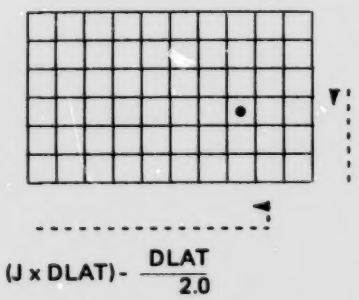
Ligne(s)	Description
435	Appelle le sous-programme FILL.

Sous-programme FILL

Ce sous-programme affecte un numéro de station à chaque case du quadrillage du lac, basé sur la proximité d'une station (avec les données pour le paramètre traité) par rapport à cette case.

Ligne(s)	Description
10	Définit DL2 comme étant la moitié de la taille d'une case.
12	Lit les zones associées à chaque case.
13, 15	XØ, YØ localisent la case, puis l'emplacement est centré.

Exemple 6



$$(I \times DLAT) - \frac{DLAT}{2.0}$$

$$(J \times DLAT) - \frac{DLAT}{2.0}$$

XO et YO sont donc les coordonnées du point central de la case en cours de lecture.

16 Si le numéro de zone affecté à cette case = 0 (c'est-à-dire qu'il s'agit de la terre ou que le numéro est éliminé), retourner sur une boucle à la case suivante.

19 L est un compteur de station (se rappeler que NSTP affecte un numéro consécutif à chaque station). Si L = 0 cette station n'a aucune donnée pour ce paramètre. Retourner sur la boucle pour consulter la station suivante. *Sinon :*

21 Definit DX = XSTAT (L) - XØ

DY = YSTAT (L) - YØ

où XSTAT et YSTAT sont les coordonnées de la case du quadrillage de la station. Par conséquent, DX et DY représentent la distance entre le point central d'une case donnée et l'emplacement de n'importe quelle station et

23 $D2 = DX^2 + DY^2$

28 DISTØ est suffisamment grand (10^6) de sorte que D2 le remplacera toujours jusqu'à ce que, finalement, la plus petite distance soit trouvée (KNEAR). La station la plus proche est ensuite affectée à cette case.

33 Les stations associées à chaque case (pour ce paramètre) sont ensuite enregistrées sur TAPE36.

37 Retourne à ALDAR.

ALDAR (suite)

Ligne(s)	Description
436	S'il existe des stations ayant des données pour ce paramètre, appelle le sous-programme INTEGRT.

Sous-programme INTEGRT

Ce sous-programme intègre les moyennes suivantes : la quantité de la couche et la quantité intégrée, le volume de la couche et le volume intégré, les valeurs de la profondeur pondérées selon la superficie et les valeurs pondérées selon le volume pour la couche et la colonne; ces valeurs sont ensuite imprimées sur la sortie. Noter que le programme traite toujours un paramètre à la fois.

Ligne(s)	Description
21	Appelle ZERØV et met à zéro THSUM et NSUM pour recevoir le nouveau paramètre.
24	Lit la zone associée à chaque cas (TAPE35) et la station associée à chaque case (TAPE36).
29	Si la zone de la case = 0 passe à la case suivante.
30	Définit NC comme étant la zone de la case, INS comme la station de la case.
33	Ne tient pas compte des données manquantes.

Ligne(s)	Description
32-36	Pour chaque profondeur indiquée par l'utilisateur, fait la somme des valeurs des cases individuelles dans la zone et le total du nombre de cases. La somme divisée par le total du nombre de cases donnera la valeur moyenne pondérée selon la superficie (ligne 93) pour cette zone.
34	Définit THSUM comme suit : THSUM (profondeur standard, zone) = THSUM (K,NC) + TH (profondeur standard, station) Le total de la somme des paramètres pour la zone (NC) du paramètre à la profondeur standard (K) Valeur du paramètre pour la profondeur standard (K) à la station inscrite dans la case (INS)
35	Définit NSUM comme suit : NSUM (profondeur standard, zone) = NSUM (K,NC) + 1 Le nombre total de cases comprises dans les calculs de la zone (NC) à la profondeur standard (K)
41-95	Traite une case à la fois. Établit dans quelle zone *se trouve* la station (case) et à quelles zones est *affectée* cette station.
41	Appelle ZERØV et met à zéro NZ, les zones auxquelles est affectée une station particulière, de même que INACT, la zone dans laquelle se trouve la station, de manière à recevoir le nouveau paramètre.
46	Lit de nouveau la zone et la station associée à chaque case et les zones éliminées.
57	Définit NS comme compteur de station.
63	Établit à quelles zones (NZ) est affectée la station NS.
68	Dès que l'on trouve une zone à laquelle est affectée la station NS, le programme commence à vérifier la position de la station et enregistre, dans INACT, la zone dans laquelle se trouve la station.
89	Calcule les valeurs pondérées selon la superficie pour chaque profondeur de la zone J.

À partir de ce point, le programme traite une zone à la fois.

Ligne(s)	Description
92	Si le nombre total de cases dans la zone à la profondeur standard I = 0 (c'est-à-dire la zone est éliminée ou le fond est atteint), laisse la boucle et passe à la ligne 98; cette profondeur est alors définie comme étant le fond de la zone.
93	Redéfinit THSUM comme étant la valeur moyenne à la profondeur standard I pour la zone J, c'est-à-dire, $$\text{THSUM} = \frac{\text{Le total de la somme des paramètres à la profondeur standard I pour toutes les cases de la zone J}}{\text{Nombre total de cases à la profondeur standard I dans la zone J}}$$

94 Pour tout le lac (= zone 25)

THSUM = THSUM (I,25) + (THSUM(I,J) x NHYP (I,J)) c'est-à-dire que la valeur moyenne à la profondeur standard I pour tout le lac est la somme totale de la valeur moyenne de la zone multipliée respectivement par le nombre de cases à cette profondeur pour chaque zone.

95 De même, NSUM pour tout le lac est la somme totale des cases de chaque zone à la profondeur standard I.

98 Définit MAXD comme étant le nombre maximal des profondeurs standard dans une zone avant d'atteindre le fond.

104 Liste les zones éliminées sur la sortie.

107 Si au moins une profondeur standard a des données pour ce paramètre et cette zone, met QUANT = VØL = NØBS = 0.

121 Sur la sortie, liste le numéro de référence de l'expédition, la zone, le nom de code en abréviation et le numéro de code du paramètre étudié; met en fonction la table traçante par l'impression des en-têtes : valeur moyenne pondérée selon la superficie, surface, quantité de couches, volume des couches, etc.; introduit dans la table la valeur DEPTH (1) (= 0.0), THSUM (valeur moyenne pondérée selon la superficie) et NHYP (surface) pour la première profondeur standard, la quantité intégrée (QUANT = 0.0) et le volume intégré (VØL = 0.0) pour DEPTH (1).

133 Définit la profondeur standard du fond de la zone. Se rappeler que si des échantillons ont été prélevés au-dessus et au-dessous de la profondeur standard, il existe des données pour THSUM; sinon THSUM = 0.0. Par conséquent, s'il n'y a pas de données à MAXD, le redéfinit à M-1, la profondeur standard précédente.

140 Saute la valeur m = 1 puisque la première profondeur est toujours 0.0 m. Calcule les valeurs qui restent.

141 Si NHYP = 0, le fond de la zone a été atteint.

Le sous-programme définit maintenant les calculs et les termes utilisés dans la sortie. Un spécimen de tous les calculs est donné à l'exemple 7 qui suit.

Ligne(s) **Description**

143 Définit DELC comme la différence (en mètres) entre les deux profondeurs indiquées.

144 Définit la quantité intégrée, DELQ comme suit :

$$DELQ = \frac{DELC}{3}\left\{(NHYP(M,J) \times THSUM(M,J)) + (NHYP(M-1,J) \times THSUM(M-1,J)) + \frac{(NHYP(M-1,J) \times THSUM(M,J)) + (NHYP(M,J) \times THSUM(M-1,J))}{2.0}\right\}$$

146 Définit QUANT, la quantité de la couche, comme la somme de la quantité intégrée pour cette profondeur plus la quantité de la couche pour la profondeur précédente.

147 Définit le volume intégré, DELV, comme suit :

$$DELV = \frac{DELC}{2}(NHYP(M,J) + NHYP(M-1,J))$$

148 Définit le volume de la couche, VØL, comme la somme totale du volume intégré à cette profondeur plus le volume de la couche pour la profondeur précédente.

149 Définit la valeur de la colonne pondérée selon le volume, QMEAN, comme la quantité intégrée divisée par le volume intégré :

$$QMEAN = \frac{DELQ}{DELV}$$

150 Définit la valeur de la couche pondérée selon le volume, QCØL, comme la quantité de la couche divisée par le volume de la couche :

$$QC\emptyset L = \frac{QUANT}{V\emptyset L}$$

151 Toutes les valeurs indiquées ci-dessus sont imprimées sur la sortie.

Exemple 7

(DEPTH) PROFONDEUR (m)	(THSUM) VALEUR MOY. PONDÉRÉE SELON LA SUPERFICIE (mg/L)	(NHYP) SURFACE (m^2)	(QUANT) QUANTITÉ DE LA COUCHE (g)	(DELQ) QUANTITÉ INTÉGRÉE (g)	(VØL) VOL. DE LA COUCHE (m^3)	(DELV) VOL. INTÉGRÉ (m^3)	(QCØL) VAL. DE LA COUCHE PONDÉRÉE SELON LE VOLUME (mg/L)	(QMEAN) VAL. DE LA COL. PONDÉRÉE SELON LE VOLUME (mg/L)
0.00	10.9639	187		0.		0.		
			2050.2493		187.		10.9639	
1.00	10.9639	187		2050.2493		187.		10.9639
5.00	10.0148	179						

Remarque : Les valeurs soulignées ont également été calculées par le sous-programme. Les calculs à 5.0 m, toutefois, ont été utilisés dans cet exemple par souci de clarté.

$$DELC = (5.0) - (1.0) = 4.0$$

$$DELQ = \frac{4.0}{3}\left\{(179) \times (10.0148) + (187) \times (10.9639) + \frac{(187) \times (10.0148)}{2.0} + \frac{(179) \times (10.9639)}{2.0}\right\}$$

$$= 7680.7351$$

$$QUANT = (7680.7351) + (2050.2493)$$

$$= 9730.9844$$

$$DELV = \frac{4.0}{2}(179 + 187)$$

$$= 732.$$

$$V\emptyset L = (732.) + (187.)$$

$$= 919.$$

$$QMEAN = \frac{(7680.7351)}{(732.)}$$

$$= 10.4928$$

$$QCØL = \frac{(9730.9844)}{(919.)}$$

$$= 10.5887$$

Sortie donnant les nouvelles valeurs incorporées :

PRO-FONDEUR (m)	VALEUR MOY PONDÉRÉE SELON LA SUPERFICIE (mg/L)	SURFACE (m^2)	QUANTITÉ DE LA COUCHE (g)	QUANTITÉ INTÉGRÉE (g)	VOL. DE LA COUCHE (m^3)	VOL. INTÉGRÉ (m^3)	VAL. DE LA COUCHE PONDÉRÉE SELON LE VOLUME (mg/L)	VAL. DE LA COL. PONDÉRÉE SELON LE VOLUME (mg/L)
0.00	10.9639	187		0.		0.		
			2050.2493		187.		10.9639	
1.00	10.9639	187		2050.2493		187.		10.9639
			9730.9844		919.		10.5887	
5.00	10.0148	179		7680.7351		732.		10.4928

Remarque : La valeur 10.9639 mg/L représente la concentration pondérée en fonction du volume à partir de la surface jusqu'à 5 m dans cette zone; la valeur 10.5887 mg/L représente la concentration pondérée en fonction du volume entre 1.0 et 5.0 m dans cette zone. De même, la quantité 9730.9844 g est la quantité du paramètre trouvée dans les 5 premiers m, tandis que 7680.7351 g est celle qui est trouvée entre 1.0 et 5.0 m.

156 Pour ALDREPS, le fichier contenant les données nécessaires pour produire l'état récapitulatif, collecte les valeurs à 1.0 m pour chaque zone (y compris 25).

157 Pour les paramètres non mesurés à des profondeurs distinctes (c'est-à-dire transmission, disque Secchi, tous les paramètres intégrés), les données sont enregistrées sous la profondeur 0.0 m; la valeur 1.0 m = 0.0. Par conséquent, oriente le programme vers la lecture de la ligne 1 de THSUM.

158 Poursuit cette boucle jusqu'à ce qu'il atteigne la zone précisée pour les données supplémentaires sur la zone-profondeur dans l'état récapitulatif; puis collecte les données sur la profondeur spécifiée et les enregistre dans ALDREPS.

168 Définit QUANTT, la quantité de ce paramètre dans le lac, comme suit :

QUANTT (kg)	=	VOL volume du lac (m^3)	x	THSUM(M,J) valeur à la profondeur au fond (mg/L)	x	1000. converti en kilogrammes	x	$(DLAT)^2$ taille de la case (km)

172 LINE est un compteur de l'imprimante qui imprime les en-têtes de colonnes au moment de commencer une nouvelle page.

181 Retourne sur la boucle pour obtenir la profondeur suivante.

182 Avance à une profondeur au-delà de celle qui a été identifiée comme le fond.

183 S'il n'y a aucune valeur pour THSUM, mais qu'il y a encore davantage de surface (NHYP ≠ 0.), imprime la profondeur standard et la valeur de la surface sur la sortie.

188 Si les observations réelles dans chaque zone, à chaque station et chaque profondeur, doivent être imprimées, il faut continuer; sinon, il faut passer à la ligne 115 du programme.

S'il a été demandé que les observations réelles soient listées, on applique la procédure des lignes 189 à 246.

Ligne(s)	Description
189	Le sous-programme ZERØV est appelé, ACTØB et ACTDP sont mis à zéro pour traiter la nouvelle zone.
198	Traite une station à la fois; lit les valeurs réelles des paramètres et leur profondeur extraites du fichier de manoeuvre 2 pour chaque station.
200	Vérifie la validité du numéro de station.
201	Affecte un numéro consécutif à la station.
203	Si la zone associée à cette station est éliminée, passe à la station suivante; si la zone n'est pas éliminée, détermine si la station est affectée à la zone présente que nous étudions et commence à copier les données sur les profondeurs et les observations réelles dans les tableaux ACTØB et ACTDP; les numéros de stations permanentes sont introduits dans ACSN.
208	MM représente les profondeurs d'échantillonnage. Si l'observation à cette station et la profondeur = 0, passer à la profondeur suivante (jusqu'à ce que les 25 profondeurs soient utilisées); si la valeur ≠ 0., le nombre d'observations influant sur les calculs dans cette zone (NØBS) augmente de 1.
215	Définit ACTØB comme le tableau contenant les observations réelles pour cette zone.
216	Définit ACTDP comme le tableau contenant les profondeurs réelles d'échantillonnage.
217	Si cette station existe dans la zone, ajouter le numéro de station, avec un astérisque, dans ACSN.
218	Si la station n'existe pas dans la zone, mais qu'elle est affectée à celle-ci, cette station est ajoutée dans ACSN sans astérisque.
221	Retourne sur la boucle pour obtenir la profondeur suivante d'échantillonnage.
223	Une fois que toutes les stations sont traitées, imprime le nombre d'observations influant sur les calculs de la zone et informe l'utilisateur que les valeurs réelles de la zone sont marquées d'astérisques.
236	Liste les stations, les observations et les profondeurs associées sur la sortie imprimée.
247	Comme il n'y a de l'espace que pour 13 observations sur la page, revient en arrière pour prendre le reste des observations (en multiples de 13) jusqu'à ce qu'elles soient toutes imprimées.
248	Continue de revenir en arrière jusqu'à ce que toutes les zones soient traitées; lorsqu'il atteint la zone 25, calcule NSUM et THSUM pour tout le lac à chaque profondeur standard puis revient en arrière sur la boucle pour calculer QUANT, VØL, etc.
	Lorsque même la zone 25 est terminée, passe à la ligne 150 du programme et liste les zones exclues.

259	Retourne à ALDAR

ALDAR (suite)

Ligne(s)	Description
439	Appelle le sous-programme SUMRY.

Sous-programme SUMRY

Ce sous-programme a deux buts. À la fin de chaque paramètre exécuté pour une expédition, il liste (par zones) les valeurs à 1 m pour ce paramètre plus toutes les données additionnelles sur la profondeur que l'utilisateur peut avoir demandée pour des zones précises (immatriculées I17, I25). Deuxièmement, il enregistre toutes ces informations sur TAPE4 de sorte que ces tableaux récapitulatifs peuvent être produits pour tout paramètre donné, en listant toutes les données sur les expéditions.

Ligne(s)	Description
12	Sur la sortie et TAPE4, écrit l'année, le lac, le nom et le numéro de code, le numéro d'expédition et les dates inclus.
24	Les zones éliminées sont exclues de la sortie.
28	Sur la sortie et TAPE4, écrit les zones et les valeurs respectives à 1 m pour les paramètres.
36	La valeur de la zone 25 est listée, séparée du reste de la sortie par des tirets.
41	Pour les paramètres intégrés, il ne peut plus y avoir de données sur la profondeur; se rend à la fin du programme et ferme TAPE4.
46	Si I17 = I25=0 (c'est-à-dire qu'aucune autre donnée sur la profondeur n'est demandée pour ce paramètre) passe la fin du programme et ferme TAPE4.

Si d'autres données sur la profondeur ont été demandées pour des zones précises effectue ce qui suit :

Ligne(s)	Description
48	Pour chaque profondeur précisée pour la zone I17 : définit M comme étant cette profondeur; si M est la profondeur du fond, écrit «BØTTØM» et la valeur associée de la profondeur sur la sortie et TAPE4, sinon liste la profondeur et la valeur.
67	Répète cette procédure pour la zone I25.
86	La prochaine étape consiste à lister la quantité de ce paramètre trouvé dans le lac. Cela est inutile si le paramètre est la température (code 104), la conductance spécifique (160) ou le pourcentage d'oxygène saturé (247). Se rappeler également que cette partie du programme a été mise de côté pour les paramètres intégrés puisque ces valeurs ne représentent pas les conditions générales du lac. Passe à la ligne 15 du programme pour fermer TAPE4 pour ces paramètres.
88	Liste QUANT (quantité du paramètre) sur la sortie et TAPE4.

94	Remet Z17, Z25 et QUANT à 0. pour le paramètre suivant.
100	Retourne à ALDAR.

ALDAR (suite)

Ligne(s)	Description
440	Revient sur la boucle pour obtenir le paramètre suivant jusqu'à ce que tous les paramètres aient été exécutés.

RÉFÉRENCES

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Rodgers, G.K. 1969. Data atlas project, progress report preparé pour le CCEI sous le n^{o} de commande H083836. Institut des Grands lacs, Université de Toronto.

Annexe A

Fonctions des bandes utilisées par le programme ALDAR

Fonctions des bandes utilisées par le programme ALDAR

Les fonctions des bandes utilisées par le programme ALDAR sont comme suit :

TAPE60 : Entrée provenant de la présentation par lots de ALDAR.

TAPE61 : Sortie finale de ALDAR.

TAPE1 : Enregistre le numéro de la station permanente (PSN), les données réelles sur la profondeur et la température et les observations des paramètres à toutes les profondeurs pour toutes les stations.

TAPE2 : Enregistre les valeurs interpolées pour chacune des profondeurs standard à toutes les stations (pour un paramètre seulement).

TAPE10 : Bande-bibliothèque enregistrant les noms de code, les numéros de code, les noms de code en abréviation et le numéro respectif des nombres décimaux.

TAPE30 : Fichier de la bathymétrie zonée pour chaque lac (en binaire).

TAPE35 : Les zones associées à chaque case.

TAPE36 : Les stations associées à chaque case.

TAPE4 : Informations de l'état récapitulatif.

Annexe B
Définition des variables du système 2000

Définition des variables du système 2000

Les variables suivantes, propres au Système 2000, enregistrent les informations réelles sur les expéditions :

Variable	Numéro de ligne	Définition
C1	244	Numéro de référence de l'expédition
C7	285	Date de la première station échantillonnée
C8	286	Date de la dernière station échantillonnée
C51	294	Latitude de la station
C52	298	Longitude de la station
C59	323	Numéro de station permanente (PSN)
C63	337	Y a-t-il des données sur l'électrobathie-thermographe (EBT)? «NUL» = NO.
C81	344	Données sur la température EBT
C82	345	Données sur la profondeur EBT
C102	356	Codes mesurés des paramètres
C101	361	Profondeurs échantillonnées
C104	370	Valeurs observées des paramètres

Annexe C
Définition des variables du programme

Définition des variables du programme

Ci-dessous sont listées les variables utilisées dans ce programme, leur définition et le numéro de ligne où il est possible de les trouver en premier lieu :

Programme	Variable	Numéro de ligne	Définition
Programme principal–ALDAR	IPASSWD	113	Mot de passe de la base de données
	DBNAM	113	Nom de la base de données
	IPACKF	113	Y a-t-il des fichiers dans le chargeur privé? = 0 Non, = 1 Oui
	IPACKN	113	Nom du chargeur
	IUSER	113	Numéro de l'utilisateur qui a servi à créer la base de données
	NUMPAR	135	Nombre de paramètres à lire (< 50)
	NACT	135	Est-ce que les observations réelles doivent être listées? = 0 Non, = 1 Oui
	NØUT	148	Nombre de zones à exclure
	KØUT	148	Zones réelles à exclure
	LAKE	155	Lac à étudier
	ICØLMN	155	Nombre de colonnes sur la carte quadrillée
	IRØW	155	Nombre de lignes sur la carte quadrillée
	IZØNES	155	Nombre de zones dans le lac (< 25)
	DLAT	155	Taille des cases du quadrillage en kilomètres
	DEPTH	159	Profondeurs standard précisées (< 20)
	KDM	164	Compteur pour les profondeurs standard

Programme	Variable	Numéro de ligne	Définition
Programme principal—ALDAR	IPØS (I)	181	IPØS (code de paramètre) = compteur de code. IPØS est un tableau qui enregistre les codes des paramètres
	ICRN	186	Numéro de référence de l'expédition
	IYR	186	Année de l'expédition
	INCØDE (I)	201	Numéros de code des paramètres précisés
	I17	223	Première zone à résumer dans l'état récapitulatif
	IDZ17 (J)	223	Nombres de profondeur standard (p. ex. première profondeur, troisième profondeur) à résumer pour la zone I17 (jusqu'à cinq profondeurs)
	I25 (=25)	230	Deuxième zone à résumer dans l'état récapitulatif (doit être la zone 25)
	IDZ25 (J)	230	Nombres de profondeur standard à résumer pour la zone I25 (jusqu'à cinq profondeurs)
	LIN	267	Compteur de station (c'est-à-dire les stations non éliminées)
	NS	268	Nombre total de stations
	C51	294	Latitude de la station en DDDMMSS
	XLAT	294	Latitude de la station en DD.MMSS
	C52	298	Longitude de la station en DDDMMSS
	XLØNG	301	Longitude de la station en DD.MMSS
	XSTIN XSTAT	305	Coordonnées X et Y pour la cartographie de la station sur la carte quadrillée (1re étape)
	YSTIN YSTAT	306	
	IS	308	Coordonnées exactes des cases pour la station
	JS	309	
	PERM	323	Numéro de station permanente, PSN
	ACTST (LIN)	324	Tableau enregistrant les PSN correspondant aux indices XSTAT et YSTAT de station

Programme	Variable	Numéro de ligne	Définition
Programme principal—ALDAR	T(J)	325	Température EBT
	Z(J)	326	Profondeur EBT
			Remarque : J = 1, 9 parce qu'il y a 9 coordonnées (profondeur, température) dans la numérisation du traceur EBT
	PAR(JJ,J)	329	Tableau pour enregistrer les valeurs de station pour le paramètre J, à la profondeur d'échantillonnage numéro JJ
			Remarque : PAR (numéro de profondeur, 1) = profondeur en mètres PAR (numéro de profondeur, compteur de code du paramètre + 1) = valeur du paramètre
	ICD	358	Compteur de code du paramètre
Sous-programme LIBRARY	ICØDE (I)	6	Numéros de code de la bibliothèque
	IFAC(I)	8	Nombre de décimales inscrites pour le paramètre
			Remarque : 99 signifie exponentiel
	ABRS(I)	8	Nom de code en abréviation pour le paramètre
	NØSCØDE	8	Nombre total de codes du paramètre
Sous-programme SELECT	PHIM	16	Point de départ de la latitude (point de référence)
	GM	16	Point de départ de la longitude (point de référence)
Sous-programme BATHY	IZBØ(J)	14	Tableau enregistrant les informations de la zone et de la profondeur pour chaque case
			Remarque : La zone et la profondeur sont enregistrées comme unité simple d'information; p. ex. si la case 14 est dans la zone 5 et la profondeur = 123 m, IZBØ (14) = 05123. Lorsque la profondeur est éliminée, IZBØ est utilisée ultérieurement pour enregistrer le numéro de zone de la case seulement.
	IXBØ	19	Profondeur de la case (valeur entière)

Programme	Variable	Numéro de ligne	Définition
Sous-programme BATHY	NØ(J)	21	Numéro de zone affecté à la case (si la zone est éliminée, NØ (J) = 0) *Remarque* : NC est la zone réelle dans laquelle se trouve la case
	ZW	23	Profondeur de la case (réelle)
	NHYP (KD, NC)	44	NHYP (numéro de profondeur standard, zone réelle)—tableau enregistrant le nombre de cases, à chacune des profondeurs standard, dans chaque zone
Sous-programme REPØRT	TH(L,M)	12	TH (profondeur standard, PSN) = valeur de paramètre interpolé Tableau contenant les données sur la profondeur standard du paramètre étudié pour les stations permanentes
	INP	28	Numéro de station «consécutif» affecté à chaque station par NSTP
	NSTP (IN)	35	Affecte un numéro consécutif à chaque station qui a des données pour le paramètre courant
	NK	35	Nombre total de profondeurs standard (incluant la profondeur 0.0) à un PSN
Sous-programme INTRPØL	PARAM	15	Observation réelle du paramètre à DEP
	DEP(J)	15	Profondeur réelle d'échantillonnage (en mètres)
	DEPTH(L)	72	Profondeur standard précisée (en mètres)
Sous-programme INTEGRT	NC	30	Numéro de la zone de la case
	INS	31	Numéro de la station de la case
	THSUM(K,NC)	34	THSUM (numéro de la profondeur standard, numéro de la zone de la case) = somme totale des paramètres à la profondeur standard numéro K pour toutes les cases dans la zone NC *Remarque* : THSUM est utilisé ultérieurement pour enregistrer les valeurs moyennes du paramètre à la profondeur K pour une case dans la zone NC

Programme	Variable	Numéro de ligne	Définition
Sous-programme INTEGRT	NSUM(K,NC)	35	Nombre total de cases, à la profondeur standard K, inclus dans le calcul de THSUM pour la zone NC
	NZ(NS, I)	64	NZ (numéro de station, numéro consécutif de zone) Tableau enregistrant les zones qui utilisent les données de cette station dans ses calculs
	INACT (NS)	82	Enregistre la zone, NC, dans laquelle est située chaque station, NS
	MAXD	98	Nombre maximum de profondeurs standard pour la zone avant d'atteindre le fond
	QUANT	107	Quantité de la couche
	VØL	108	Volume de la couche
	NØBS	109	Nombre d'observations influant sur les calculs dans la zone J
	DELC	143	Différence entre deux profondeurs standard (en mètres)
	DELQ	144	Quantité intégrée
	DELV	147	Volume intégré
	QMEAN	149	Valeur de la colonne pondérée en fonction du volume (c'est-à-dire à partir de la surface jusqu'à la profondeur K)
	QCØL	150	Valeur de la couche pondérée en fonction du volume (c'est-à-dire à partir de la profondeur (K) jusqu'à la profondeur (K+1))
	WAREA (J)	156	Valeur pondérée en fonction de la surface pour la zone J (à être utilisée dans l'état récapitulatif)
	Z17 (I)	160	Pour l'état récapitulatif, la valeur à la profondeur standard, I, de la première zone indiquée
	Z25(I)	165	Pour l'état récapitulatif, la valeur à la profondeur standard, I, de la zone 25 (tout le lac)
	QUANTT	168	Quantité du paramètre dans le lac

Programme	Variable	Numéro de ligne	Définition
Sous-programme INTEGRT	ACTØB	189	Observations réelles d'échantillonnage concernant la zone
	ACTDP	190	Profondeurs réelles d'échantillonnage concernant la zone
	ACSN	191	Stations PSN influant sur les calculs dans la zone
	NST≡NS	193	Numéros des stations
	XNØB	198	Valeur réelle du paramètre observé (enregistrée sur TAPE2)
	NSTT≡INP	201	Numéro de station consécutif pour la station d'échantillonnage réel
	NSZ	202	Numéro de zone consécutif
	NØBS	208	Nombre d'observations influant sur les calculs dans la zone

Annexe D
Programme ALDAR et sous-programmes

```
      CALDAR
            PROGRAM ALDAR (INPUT=64,OUTPUT=64,TAPE60=INPUT,TAPE61=OUTPUT,
           1  TAPE1=512,TAPE2=512,TAPE10=512,TAPE30,TAPE35=512,TAPE36=512,
           1  TAPE4=64)
      C
      C     PROGRAM ALDAR CALCULATES VOLUME WEIGHTED AVERAGES FOR LAKE ZONE
      C     DATA BY ARBITARY REGIONS.
      C
            INTEGER C51,C52,C7,C8
            DIMENSION IPOS(1000),ITITLE(8),T(9),Z(9),A(5),B(5)
            COMMON /STAT/ ICRN,INCODE(50),TH(20,200),NSTP(200),ACTST(200),
           1              NACT,PAR(25,51)
            COMMON /IN/ KDM,DEPTH(24),NOUT,KOUT(20),IZONES
            COMMON /MAP/ NO(300),IROW,ICOLMN,IZBO(300),NHYP(20,25)
            COMMON /VARS/ XSTAT(200),YSTAT(200),LIN,DLAT
            COMMON /CON/ ICODE(350),IFAC(350),ABRS(350),NOSCODE
            COMMON /SUM/ WAREA(25),Z17(5),Z25(5),IDZ17(5),IDZ25(5),
           1  QUANT,I17,I25
      C
      C  SET UP SCHEMAS FOR S2K STAR DATA BASE
      C
      CPL   COMMBLOCK/DBNAM/ISCHME,IRTNCD,DFILL,LASTS,IPASSWD,IDATAS,
      CPL  1  IDATAP,LEVEWL,ITIME,IDATE,ICYCLE,ISEPSV,IENT,ISTA.
            COMMON/DBNAM/DBNAM
            INTEGER DBNAM(21),ISCHME(3),IRTNCD,DFILL,LASTS,IPASSWD,IDATAS,
           -IDATAP,LEVEWL,ITIME,IDATE,ICYCLE,ISEPSV,IENT,ISTA
            EQUIVALENCE (DBNAM(6),ISCHME(1)),(DBNAM(9),IRTNCD),(DBNAM(10),
           -DFILL),(DBNAM(11),LASTS),(DBNAM(12),IPASSWD),(DBNAM(13),IDATAS),
           -(DBNAM(14),IDATAP),(DBNAM(15),LEVEWL),(DBNAM(16),ITIME),
           -(DBNAM(17),IDATE),(DBNAM(18),ICYCLE),(DBNAM(19),ISEPSV),
           -(DBNAM(20),IENT),(DBNAM(21),ISTA)
      CPL   SCHEMA/CRUISE OF DBNAM/C1,C7,C8.
            COMMON/CRUISE/CRUISE
            INTEGER CRUISE(27)
            EQUIVALENCE (CRUISE(25),C1),(CRUISE(26),C7),(CRUISE(27),C8)
      CPL   SCHEMA/STAT OF DBNAM/C51,C52,C59,C63.
            COMMON/STAT/STAT
            INTEGER STAT(34)
            EQUIVALENCE (STAT(31),C51),(STAT(32),C52),(STAT(33),C59),
           -(STAT(34),C63)
      CPL   SCHEMA/DEPPAR OF DBNAM/C101,C102,C104.
            COMMON/DEPPAR/DEPPAR
            INTEGER DEPPAR(27)
            EQUIVALENCE (DEPPAR(25),C101),(DEPPAR(26),C102),(DEPPAR(27),C104)
      CPL   SCHEMA/BTS OF DBNAM/C81,C82.
            COMMON/BTS/BTS
            INTEGER BTS(20)
            EQUIVALENCE (BTS(19),C81),(BTS(20),C82)
      CPL   $BLOCKS.
            COMMON/S2KDUM/S2KDUM(35)
            INTEGER S2KDUM,S2KDU1,S2KRTC,S2KCNT,S2KDU2,S2KDU3,S2KDU4,S2KDU5,
           -S2KDU6,S2KDU7,S2KDU8,S2KDU9,S2KDU11,S2KSRT,S2KLKH(10)
            EQUIVALENCE(S2KDUM(1),S2KDU1),(S2KDUM( 2),S2KRTC),(S2KDUM( 3),
           -S2KCNT),(S2KDUM( 4),S2KDU2),(S2KDUM( 5),S2KDU3),(S2KDUM( 7),
           -S2KDU4),(S2KDUM(14),S2KDU5),(S2KDUM(15),S2KDU6),(S2KDUM(16),
           -S2KDU7),(S2KDUM(20),S2KDU8),(S2KDUM(21),S2KDU9),(S2KDUM(22),
           -S2KSRT),(S2KDUM(23),S2KDU11),(S2KDUM(26),S2KLKH(1))
            INTEGER S2R1(2)
            DATA DBNAM/10HDBNAM     ,10H           ,0,21,17*0/
            DATA CRUISE(1),CRUISE(2),CRUISE(3),CRUISE(4),CRUISE(5),
           -CRUISE(6)/10HCRUISE    ,10H           ,10H           ,3,0,16777219 /
            DATA CRUISE(7),CRUISE(8),CRUISE(9),CRUISE(10),CRUISE(11),
           -CRUISE(12) /10HC1      ,10H           ,10H           ,100,0,
           -2097162 /
            DATA CRUISE(13),CRUISE(14),CRUISE(15),CRUISE(16),CRUISE(17),
           -CRUISE(18) /10HC7      ,10H           ,10H           ,130,0,
           -2097162 /
            DATA CRUISE(19),CRUISE(20),CRUISE(21),CRUISE(22),CRUISE(23),
           -CRUISE(24) /10HC8      ,10H           ,10H           ,80,0,
           -2097162 /
            DATA STAT(1),STAT(2),STAT(3),STAT(4),STAT(5),
           -STAT(6)/10HSTAT        ,10H           ,10H           ,4,0,16777220 /
            DATA STAT(7),STAT(8),STAT(9),STAT(10),STAT(11),STAT(12)
           -/10HC51        ,10H           ,10H           ,240,0,2097162 /
            DATA STAT(13),STAT(14),STAT(15),STAT(16),STAT(17),STAT(18)
           -/10HC52        ,10H           ,10H           ,190,0,2097162 /
            DATA STAT(19),STAT(20),STAT(21),STAT(22),STAT(23),STAT(24)
```

```
      -/10HC59       ,10H           ,10H           ,140,0,2097162 /
      DATA STAT(25),STAT(26),STAT(27),STAT(28),STAT(29),STAT(30)
      -/10HC63       ,10H           ,10H           ,90,0,2097162 /
      DATA DEPPAR(1),DEPPAR(2),DEPPAR(3),DEPPAR(4),DEPPAR(5),
     -DEPPAR(6)/10HDEPPAR    ,10H           ,10H           ,3,0,16777219 /
      DATA DEPPAR(7),DEPPAR(8),DEPPAR(9),DEPPAR(10),DEPPAR(11),
     -DEPPAR(12) /10HC101       ,10H           ,10H           ,180,0,
     -2097162 /
      DATA DEPPAR(13),DEPPAR(14),DEPPAR(15),DEPPAR(16),DEPPAR(17),
     -DEPPAR(18) /10HC102       ,10H           ,10H           ,130,0,
     -2097162 /
      DATA DEPPAR(19),DEPPAR(20),DEPPAR(21),DEPPAR(22),DEPPAR(23),
     -DEPPAR(24) /10HC104       ,10H           ,10H           ,80,0,
     -2097162 /
      DATA BTS(1),BTS(2),BTS(3),BTS(4),BTS(5),BTS(6)/10HBTS
     -10H           ,10H           ,2,0,16777218 /
      DATA BTS(7),BTS(8),BTS(9),BTS(10),BTS(11),BTS(12) /10HC81
     -10H           ,10H           ,120,0,2097162 /
      DATA BTS(13),BTS(14),BTS(15),BTS(16),BTS(17),BTS(18)
     -/10HC82       ,10H           ,10H           ,70,0,2097162 /
      DATA S2KDUM/5*0,1,2*0,1H ,10HR2.00D    ,10H 83/08/24.,
     -10H 09.18.58.,10H           ,0,-1,10*0,10*-1/
      DATA S2R1/2,143/
CPL   START S2K.
      S2KDU1=91
      S2KDU3=0
      CALL S2KPL1(S2KDUM)
C
C  SET THE PRINTER TO 8 LINES/INCH
C
      WRITE(61,40)
40    FORMAT(1HT)
C
C  READ IN THE DATA BASE SPECIFICATIONS AND OPEN THE S2K DATA BASE
C
      READ(60,5) IPASSWD,DBNAM(1),IPACKF,IPACKN,IUSER
5     FORMAT(A10,A10,I1,A4,1X,A3)
      CALL USERDBX(2HDB)
      CALL ATTS2K(DBNAM(1),IPACKF,IPACKN,IUSER)
CPL   OPEN/READ DBNAM.
      S2KDU1=61
      CALL S2KPL2(S2KDUM, DBNAM)
C  CHECK RETURN CODE
      IF (IRTNCD.EQ.0) GO TO 6
      WRITE(61,7) IRTNCD
7     FORMAT(* DATA BASE CANNOT BE OPENED-RETURN CODE IS*,I7)
      GO TO 999
C  CHECK STATUS
6     IF (ISTA.EQ.0) GO TO 8
      WRITE(61,9) ISTA
9     FORMAT(* WARNING DATA BASE DAMAGED-STATUS=*,I2)
      GO TO 1999
8     CONTINUE
C
C     READ IN THE NO. OF PARAMETERS AND WHETHER ACTUAL OBSERVATIONS IN
C     EACH ZONE WILL BE PRINTED
C
      READ(60,50) NUMPAR,NACT
50    FORMAT(I3,5X,I1)
      WRITE(61,150) NUMPAR
150   FORMAT(1H1,5HALDAR,/1H ,5H-----,
     1  /1H0,*NUMBER OF PARAMETER CODES = *,I2)
      IF (NACT.EQ.0) WRITE(61,151)
151   FORMAT(1H0,*ACTUAL OBSERVATIONS IN EACH ZONE WILL NOT BE PRINTED*)
      IF (NACT.EQ.1) WRITE(61,152)
152   FORMAT(1H0,*ACTUAL OBSERVATIONS IN EACH ZONE WILL BE PRINTED*)
C
C      READ IN THE ZONE NUMBERS THAT ARE TO BE EXCLUDED
C     IN THE CALCULATIONS.
C
      READ(60,51) NOUT,KOUT
51    FORMAT(I2,20I3)
      IF(NOUT.NE.0) WRITE(61,160)NOUT,(KOUT(I),I=1,NOUT)
160   FORMAT(1H0,*THE FOLLOWING*,I3,* ZONES ARE EXCLUDED: *,20I3)
C
C     READ IN THE HEADER RECORD OF THE ZONE BATHYMETRY FILE.
C
```

```
      READ (30) (ITITLE(N),N=1,8 ),LAKE,ICOLMN,IROW,IZONES,DLAT
C
CC    READ IN THE STANDARD DEPTHS.
C
      READ (60,60) DEPTH
 60   FORMAT (8F10.2)
C
CC    DETERMINE THE NUMBER OF STANDARD DEPTH VALUES.
C
      KDM = 1
      DO 10 I=2,24
      IF (DEPTH(I).EQ.0.0) GO TO 20
      KDM = KDM+1
 10   CONTINUE
 20   IF (KDM.GT.20) STOP 222
      WRITE(61,170)KDM,(DEPTH(I),I=1,KDM)
170   FORMAT(1H0,I2,* STANDARD DEPTHS: *,3(/1H ,20X,8F10.2))
C
CC    CHECK FOR THE ARRAY LIMITS.
C
      IF (IZONES.GT.25) WRITE (61,70)
 70   FORMAT (/2X,34HNUMBER OF ZONES IS GREATER THAN 25)
      IF (IZONES.GT.25) STOP 04
      IF (IROW.GT.300) WRITE (61,80)
 80   FORMAT (/2X,46HROW BATHYMETRY DIMENSIONS ARE GREATER THAN 300)
      IF (IROW.GT.300) STOP 03
      IF(NUMPAR.GT.50)NUMPAR = 50
      IF (NUMPAR.LE.0) STOP05
C
C  READ IN THE DESIRED CRUISE REFERENCE NUMBER.
C
      READ (60,90) ICRN,IYR
 90   FORMAT (A7,T1,I2)
      WRITE(61,100) ICRN
 100  FORMAT(8H0CRUISE ,A7)
C
C  RETRIEVE THE CODES FOR THE DESIRED YEAR
C
      CALL LIBRARY(IYR)
C
CC    READ IN THE PARAMETER CODES TO BE EXAMINED.
C  IF EBT VALUES ARE WANTED, ONLY ONE CODE MUST BE READ IN, AND
C  IT MUST BE A TEMPERATURE CODE (100 OR 104)
C  IF CODE 104 WAS SPECIFIED FOR A CRUISE BEFORE 1972, IT IS CHANGED
C  TO CODE 100.
C
      READ (60,100) (INCODE(I),I=1,NUMPAR)
 100  FORMAT (20I4)
      WRITE(61,190)(INCODE(I),I=1,NUMPAR)
 190  FORMAT(1H0,*PARAMETER CODES:*,2(25I4,/))
      DO 23 I=1,NUMPAR
      IF (INCODE(I).EQ.104.AND.IYR.LT.72) PRINT 24
24    FORMAT(1H0,*NOTE - CODE 100 IS USED INSTEAD OF CODE 104*,
     1  * SINCE 104 WAS NOT MEASURED BEFORE 1972*)
      IF (INCODE(I).EQ.104.AND.IYR.LT.72) INCODE(I)=100
23    CONTINUE
C
C  IPOS(PARAMETER CODE) = CODE COUNTER
C
      CALL ZEROV(IPOS,1000)
      DO 2 I=1,NUMPAR
      L=INCODE(I)
      IPOS(L)=I
      CALL CON1(INCODE(I))
2     CONTINUE
C
C  READ ZONES AND DEPTHS FOR SUMMARY REPORT
C
      READ (60,100) I17,(IDZ17(J),J=1,5)
      IF (EOF(60).NE.0) GO TO 49
      DO 110 J=1,5
      JJ=5-J+1
      IF (IDZ17(JJ).NE.0) GO TO 111
110   CONTINUE
111   WRITE(61,200) I17,(IDZ17(J),J=1,JJ)
      READ (60,100) I25,(IDZ25(J),J=1,5)
      IF (EOF(60).NE.0) GO TO 49
```

```
                      IF (I25.NE.25) GO TO 49
                      DO 112 J=1,5
                      JJ=5-J+1
235                   IF (IDZ25(JJ).NE.0) GO TO 113
                112   CONTINUE
                113   WRITE(61,200) I25,(IDZ25(J),J=1,JJ)
                200   FORMAT(1H0,*DEPTH NUMBERS FOR ZONE*,I3,* IN SUMMARY REPORT ARE *,
                     1  5I3)
240             49    CONTINUE
                C
                C  LOCATE ALL THE STATIONS FOR THE CRUISE
                C
                CPL   LOCATE STAT WHERE C1 EQ ICRN.
245                   S2KDU1=10
                      S2KDU2=0
                      CALL S2KPL6(S2KDUM, DBNAM, STAT, S2R1, CRUISE(7), ICRN)
                      NS=IDATAS
                      IF (NS.NE.0) GO TO 53
250                   WRITE(61,54) ICRN
                54    FORMAT(1H0,*CRUISE *,A7,* NOT FOUND*)
                      STOP54
                53    CONTINUE
                C
255             C     SET CONSTANTS FOR THE SPECIFIED LAKE.
                C
                      CALL SELECT (LAKE,PHIM,GM,A,B)
                C
                C  READ IN THE BATHYMETRY DATA AND DETERMINE THE ZONES FOR EACH
260             C  CELL IN THE LAKE
                C
                      CALL BATHY
                C
                C
265             C  RETRIEVE ONE STATION AT A TIME
                C
                      LIN=0
                      DO 11 I=1,NS
                CPL   GET STAT NEXT.
270                   S2KDU1=24
                      S2KDU2=0
                      CALL S2KPL4(S2KDUM, DBNAM, STAT, S2KDU6, S2KDU7)
                      IF (IRTNCD.EQ.4) GO TO 16
                      IF (IRTNCD.EQ.0) GO TO 55
275                   WRITE(61,56) IRTNCD
                56    FORMAT(1H0,*ERROR ON GET STAT, IRTNCD = *,I5)
                      STOP56
                55    CONTINUE
                C
280                   IF (I.NE.1) GO TO 103
                CPL   GETA CRUISE.
                      S2KDU1=40
                      S2KDU2=0
                      CALL S2KPL4(S2KDUM, DBNAM, CRUISE, S2KDU6, S2KDU7)
285                   ID1=C7
                      ID2=C8
                      IF (IRTNCD.NE.0) WRITE(61,102) IRTNCD
                102   FORMAT(1H ,*ERROR ON GETA CRUISE, IRTNCD = *,I5)
                      IF (IRTNCD.NE.0) GO TO 1999
290             103   LIN=LIN+1
                C
                C  CHANGE DDDMMSS OF LATITUDE AND LONGITUDE TO DD.MMSS
                C
                      LAT=C51/10000.
295                   MIN=(C51-LAT*10000.)/100.
                      ISEC=MOD(C51,100)
                      XLAT=LAT+MIN/60.+ISEC/3600.
                      LONG=C52/10000.
                      MIN=(C52-LONG*10000.)/100.
300                   ISEC=MOD(C52,100)
                      XLONG=LONG+MIN/60.+ISEC/3600.
                C
                      G = GM-XLONG
                      P = XLAT-PHIM
305                   XSTIN = G*A(1)+P*A(2)+P*G*A(3)+(G**2)*A(4)+(P**2)*A(5)
                      YSTIN = G*B(1)+P*B(2)+P*G*B(3)+(G**2)*B(4)+(P**2)*B(5)
                C
                      IS=(XSTIN+DLAT/2.)/DLAT
```

```
      JS=(YSTIN+DLAT/2.)/DLAT
C
C  DO NOT COLLECT STATIONS IN THE ELIMINATED ZONES
C
      REWIND 35
      DO 106 JJ=1,JS
      READ (35) (NO(II),II=1,IROW)
106   CONTINUE
      IF (NO(IS).NE.0) GO TO 107
      LIN=LIN-1
      GO TO 11
C
107   XSTAT(LIN)=XSTIN
      YSTAT(LIN)=YSTIN
      PERM=C59
      ACTST(LIN)=PERM
      CALL ZEROV(T,9)
      CALL ZEROV(Z,9)
      DO 3 J=1,51
      DO 3 JJ=1,25
      PAR(JJ,J)=-1.0
3     CONTINUE
C
C  RETRIEVE BT DATA WHEN IT EXISTS FOR THE STATION
C
      IF (NUMPAR.GT.1) GO TO 14
      IC=INCODE(1)
      IF (ICODE(IC).NE.100.AND.ICODE(IC).NE.104) GO TO 14
      BTYPE=C63
      IF (C63.EQ.4H-NUL) GO TO 14
      DO 12 J=1,9
CPL   GETD BTS NEXT.
      S2KDU1=34
      S2KDU2=0
      CALL S2KPL4(S2KDUM, DBNAM, BTS, S2KDU6, S2KDU7)
      T(J)=C81
      Z(J)=C82
12    CONTINUE
14    CONTINUE
C
C  GET THE NEXT DEPTH AND PARAMETER RECORD
C
CPL   GETD DEPPAR NEXT.
      S2KDU1=34
      S2KDU2=0
      CALL S2KPL4(S2KDUM, DBNAM, DEPPAR, S2KDU6, S2KDU7)
      IF (IRTNCD.EQ.4) GO TO 13
      DECODE(3,105,C102) NCODE
105   FORMAT(I3)
      ICD=IPOS(NCODE)
      IF (ICD.EQ.0) GO TO 14
      ICD=ICD+1
      DEPS=C101
C
C  PAR(DEPTH NO.,1) = DEPTH IN METRES
C  PAR(DEPTH NO.,PARAMETER CODE COUNTER+1) = PARAMETER VALUE
C
      DO 17 J=1,25
      IF (PAR(J,1).EQ.-1.0) PAR(J,1)=DEPS
      IF (PAR(J,1).EQ.DEPS) GO TO 18
17    CONTINUE
18    PAR(J,ICD)=C104
      GO TO 14
13    CONTINUE
C
C
C  IF EBTS WERE REQUESTED, THE VALUES ARE TRANSFERRED TO THE ARRAY PAR.
C  IF THE EBTS ARE NOT AVAILABLE, THE DEPTH AND TEMPERATURE
C  VALUES FOR THE STATION ARE USED.
C
      NP1=NUMPAR+1
      IF (NUMPAR.GT.1) GO TO 26
      IC=INCODE(1)
      IF (ICODE(IC).NE.100.AND.ICODE(IC).NE.104) GO TO 26
      IF (BTYPE.EQ.4H-NUL) GO TO 26
C
      DO 28 J=1,25
```

```
                      IF (J.LE.9) PAR(J,1)=Z(J)
                      IF (J.LE.9) PAR(J,2)=T(J)
                      IF (J.GT.9.OR.(PAR(J,1).EQ.0.0.AND.PAR(J,2).EQ.0.0)) PAR(J,1)=-1.0
                      IF (J.GT.9.OR.(PAR(J,1).EQ.-1.0.AND.PAR(J,2).EQ.0.0))PAR(J,2)=-1.0
  390           28    CONTINUE
                C
                C   WRITE THE PERMANENT STATION NUMBER AND
                C   PARAMETER VALUES FOR ONE STATION ONTO A SCRATCH FILE
                C
  395           26    WRITE(1) PERM,((PAR(J,K),J=1,25),K=1,NP1)
                C
                11    CONTINUE
                C
                CC  ALL DATA FOR THIS RUN HAS BEEN ACCUMULATED
  400           C
                16    ENDFILE 1
                C
                C   NOW PROCESS EACH PARAMETER
                C
  405                 DO 19 I=1,NUMPAR
                      REWIND 1
                      REWIND 2
                      IC=INCODE(I)
                      IF (NUMPAR.GT.1) GO TO 22
  410                 IF (ICODE(IC).NE.100.AND.ICODE(IC).NE.104) GO TO 22
                      IC=1
                      IFAC(IC)=0
                      ICODE(IC)=0
                      ABRS(IC)=3HEBT
  415           22    WRITE(61,114) ABRS(IC),ICODE(IC)
                114   FORMAT(1H1,*PARAMETER *,A4,2H (,I4,1H))
                      IF(IFAC(IC).NE.99)WRITE (61,130) (DEPTH(L),L=1,KDM)
                 130  FORMAT (1H0,*STANDARD DEPTHS:*,/1H0,5X,20F6.0/)
                      IF(IFAC(IC).EQ.99) WRITE(61,135)(DEPTH(L),L=1,KDM)
  420           135   FORMAT(1H0,*STANDARD DEPTHS:*,/1H0,5X,15F8.0,/6X,5F8.0/)
                C
                C     REWIND FILE NUMBER 35 WHICH CONTAINS THE ZONE NUMBER ASSOCIATED
                C     WITH EACH CELL IN THE LAKE AND FILE NUMBER 36 WHICH CONTAINS
                C     THE STATION NUMBER ASSOCIATED WITH EACH CELL.
  425           C
                      REWIND 35
                      REWIND 36
                C
                CC  PRODUCE A REPORT OF INTERPOLATED VALUES FOR EACH PARAMETER
  430           C
                      CALL REPORT(I,NUMPAR)
                C
                C     CALCULATE VOLUME WEIGHTED AVERAGES FOR EACH LAYER AND ZONE.
                C
  435                 CALL FILL
                      IF(LIN.GT.0) CALL INTEGRT (IC)
                      WRITE (61,140)
                 140  FORMAT (1H1)
                      CALL SUMRY(ABRS(IC),ICODE(IC),LAKE,IYR,ID1,ID2,ICRN)
  440           19    CONTINUE
                C
                1999  CONTINUE
                C  CLOSE THE S2K FILE
                CPL   CLOSE DBNAM.
  445                 S2KDU1=97
                      CALL S2KPL2(S2KDUM, DBNAM)
                999   CONTINUE
                CPL   STOP S2K.
                      S2KDU1=92
  450                 CALL S2KPL1(S2KDUM)
                      STOP
                C
                      END
```

SYMBOLIC REFERENCE MAP (R=1)

ENTRY POINTS
10134 ALDAR

VARIABLES	SN	TYPE	RELOCATION	
13704	A	REAL	ARRAY	
10233	ACTST	REAL	ARRAY	STAT
0	BTS	INTEGER	ARRAY	BTS
0	CRUISE	INTEGER	ARRAY	CRUISE
30	C101	REAL		DEPPAR
32	C104	REAL		DEPPAR
13176	C52	INTEGER		STAT
13200	C63	REAL		STAT
32	C8	INTEGER		CRUISE
23	C82	REAL		BTS
0	DEPPAR	INTEGER	ARRAY	DEPPAR
1	DEPTH	REAL	ARRAY	IN
621	DLAT	REAL		VARS
11652	GM	REAL		
11673	IC	INTEGER		
0	ICODE	INTEGER	ARRAY	CON
0	ICRN	INTEGER		STAT
15	IDATAP	INTEGER		DBNAM
20	IDATE	INTEGER		DBNAM
50	IDZ25	INTEGER	ARRAY	SUM
11654	ID2	INTEGER		
536	IFAC	INTEGER	ARRAY	CON
1	INCODE	INTEGER	ARRAY	STAT
11636	IPACKN	INTEGER		
11702	IPOS	INTEGER	ARRAY	
10	IRTNCD	INTEGER		DBNAM
5	ISCHME	INTEGER	ARRAY	DBNAM
22	ISEPSV	INTEGER		DBNAM
17	ITIME	INTEGER		DBNAM
11637	IUSER	INTEGER		
456	IZBO	INTEGER	ARRAY	MAP
56	I17	INTEGER		SUM
11646	J	INTEGER		
11670	JS	INTEGER		
0	KDM	INTEGER		IN
11645	L	INTEGER		
12	LASTS	INTEGER		DBNAM
16	LEVEWL	INTEGER		DBNAM
11661	LONG	INTEGER		
11642	N	INTEGER		
11675	NCODE	INTEGER		
0	NO	INTEGER	ARRAY	MAP
31	NOUT	INTEGER		IN
11650	NS	INTEGER		
11640	NUMPAR	INTEGER		
10544	PAR	REAL	ARRAY	STAT
11651	PHIM	REAL		
13137	STAT	INTEGER	ARRAY	STAT
0	S2KDUM	INTEGER	ARRAY	S2KDUM
26	S2KDU11	INTEGER		S2KDUM
4	S2KDU3	INTEGER		S2KDUM
15	S2KDU5	INTEGER		S2KDUM
17	S2KDU7	INTEGER		S2KDUM
24	S2KDU9	INTEGER		S2KDUM
1	S2KRTC	INTEGER		S2KDUM
13716	S2R1	INTEGER	ARRAY	
63	TH	REAL	ARRAY	STAT
11660	XLAT	REAL		
0	XSTAT	REAL	ARRAY	VARS
310	YSTAT	REAL	ARRAY	VARS
13673	Z	REAL	ARRAY	
36	Z25	REAL	ARRAY	SUM

1274	ABRS	REAL	ARRAY	CON
13711	B	REAL	ARRAY	
11674	BTYPE	REAL		
30	C1	REAL		CRUISE
31	C102	REAL		DEPPAR
13175	C51	INTEGER		STAT
13177	C59	REAL		STAT
31	C7	INTEGER		CRUISE
22	C81	REAL		BTS
0	DBNAM	INTEGER	ARRAY	DBNAM
11677	DEPS	REAL		
11	DFILL	INTEGER		DBNAM
11663	G	REAL		
11641	I	INTEGER		
11676	ICD	INTEGER		
455	ICOLMN	INTEGER		MAP
21	ICYCLE	INTEGER		DBNAM
14	IDATAS	INTEGER		DBNAM
43	IDZ17	INTEGER	ARRAY	SUM
11653	ID1	INTEGER		
23	IENT	INTEGER		DBNAM
11671	II	INTEGER		
11635	IPACKF	INTEGER		
13	IPASSWD	INTEGER		DBNAM
454	IROW	INTEGER		MAP
11667	IS	INTEGER		
11657	ISEC	INTEGER		
24	ISTA	INTEGER		DBNAM
13652	ITITLE	INTEGER	ARRAY	
11644	IYR	INTEGER		
56	IZONES	INTEGER		IN
57	I25	INTEGER		SUM
11647	JJ	INTEGER		
11701	K	INTEGER		
32	KOUT	INTEGER	ARRAY	IN *
11643	LAKE	INTEGER		
11655	LAT	INTEGER		
620	LIN	INTEGER		VARS
11656	MIN	INTEGER		
10543	NACT	INTEGER		STAT
1132	NHYP	INTEGER	ARRAY	MAP
2032	NOSCODE	INTEGER		CON
11700	NP1	INTEGER		
7723	NSTP	INTEGER	ARRAY	STAT
11664	P	REAL		
11672	PERM	REAL		
55	QUANT	REAL		SUM
2	S2KCNT	INTEGER		S2KDUM
0	S2KDU1	INTEGER		S2KDUM
3	S2KDU2	INTEGER		S2KDUM
6	S2KDU4	INTEGER		S2KDUM
16	S2KDU6	INTEGER		S2KDUM
23	S2KDU8	INTEGER		S2KDUM
31	S2KLKH	INTEGER	ARRAY	S2KDUM
25	S2KSRT	INTEGER		S2KDUM
13662	T	REAL	ARRAY	
0	WAREA	REAL	ARRAY	SUM
11662	XLONG	REAL		
11665	XSTIN	REAL		
11666	YSTIN	REAL		
31	Z17	REAL	ARRAY	SUM

FILE NAMES		MODE								
0	INPUT		154	OUTPUT	FMT	330	TAPE1	UNFMT	2460	TAPE10
1404	TAPE2		3534	TAPE30	UNFMT	5610	TAPE35	UNFMT	6664	TAPE36
7740	TAPE4		0	TAPE60	FMT	154	TAPE61	FMT		

EXTERNALS	TYPE	ARGS			
ATTS2K		4	BATHY		0
CON1		1	EOF	REAL	1
FILL		0	INTEGRT		1
LIBRARY		1	REPORT		2

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EXTERNALS TYPE ARGS

SELECT	5	SUMRY	7
S2KPL1	1	S2KPL2	2
S2KPL4	5	S2KPL6	6
USERDBX	1	ZEROV	2

INLINE FUNCTIONS TYPE ARGS

MOD	INTEGER	2	INTRIN

STATEMENT LABELS

0	2		0	3		11156	5	FMT	
10160	6		11165	7	FMT	10164	8		
11177	9	FMT	0	10		10716	11		
0	12		10646	13		10613	14		
10721	16		0	17		10642	18		
0	19		10222	20		10743	22		
0	23		11422	24	FMT	10710	26		
0	28		11143	40	FMT	10400	49		
11213	50	FMT	11264	51	FMT	10411	53		
11477	54	FMT	10427	55		11510	56	FMT	
11320	60	FMT	11340	70	FMT	11351	80	FMT	
11366	90	FMT	11404	100	FMT	11521	102	FMT	
10442	103		11541	105	FMT	0	106		
10542	107		0	110		10350	111		
0	112		10373	113		11557	114	FMT	
11570	130	FMT	11601	135	FMT	11614	140	FMT	
11221	150	FMT	11234	151	FMT	11247	152	FMT	
11273	160	FMT	11327	170	FMT	11374	180	FMT	
11412	190	FMT	11463	200	FMT	11017	999		
11014	1999								

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES		
10215	10	I	165 168	5B	OPT	EXITS	
10302	23	I	205 210	17B		EXT REFS	
10324	2	I	215 219	10B		EXT REFS	
10342	110	J	225 228	6B	OPT	EXITS	
10365	112	J	233 236	6B	OPT	EXITS	
10416	11	I	260 397	303B		EXT REFS	EXITS NOT INNER
10526	106	JJ	314 316	10B		EXT REFS	
10554	3	J	327 330	13B		NOT INNER	
10561	3	JJ	328 330	2B	OPT		
10602	12	J	339 346	11B		EXT REFS	
10631	17	J	366 369	11B	OPT	EXITS	
10664	28	J	385 390	23B	OPT		
10724	19	I	405 440	70B		EXT REFS	

COMMON BLOCKS LENGTH

STAT	5761
IN	47
MAP	1102
VARS	402
CON	1051
SUM	48
DBNAM	21
CRUISE	27
DEPPAR	27
BTS	20
S2KDUM	35

STATISTICS

PROGRAM LENGTH	4525B	2389
BUFFER LENGTH	7211B	3721
CM LABELED COMMON LENGTH	20535B	8541
52000B CM USED		

```
      SUBROUTINE LIBRARY (KYR)
      COMMON/CON/ICODE(350),IFAC(350),ABRS(350),NOSCODE
C
C--   THIS SUBROUTINE RETRIEVES THE CORRECT SET OF CODES, NUMBER
C--   OF DECIMAL PLACES, AND ABBREVIATED NAMES FOR THE YEAR.
C
      REWIND 10
    2 READ(10) IYR,NOSCODE,(ICODE(I),IFAC(I),ABRS(I),I=1,NOSCODE)
      IF(EOF(10).NE.0) GO TO 1
      IF(IYR.NE.KYR) GO TO 2
      RETURN
    1 WRITE(61,10) KYR
   10 FORMAT(10X,21HERROR ON LIBRARY CARD/10X,7HYEAR 19,I2,20H IS NOT A
     1VALID YEAR)
      STOP
      END
```

SYMBOLIC REFERENCE MAP (R=1)

```
ENTRY POINTS
    3  LIBRARY

VARIABLES     SN  TYPE           RELOCATION
 1274  ABRS      REAL       ARRAY    CON            71  I         INTEGER
    0  ICODE     INTEGER    ARRAY    CON           536  IFAC      INTEGER    ARRAY    CON
   70  IYR       INTEGER                              0  KYR       INTEGER             F.P.
 2032  NOSCODE   INTEGER             CON

FILE NAMES       MODE
      TAPE10     UNFMT              TAPE61    FMT

EXTERNALS          TYPE   ARGS
      EOF        REAL       1

STATEMENT LABELS
   32  1                                   7  2                                  56  10       FMT

LOOPS  LABEL     INDEX      FROM-TO     LENGTH     PROPERTIES
   12            I             0 0        12B              EXT REFS

COMMON BLOCKS    LENGTH
      CON          1051

STATISTICS
  PROGRAM LENGTH                  72B       58
  CM LABELED COMMON LENGTH      2033B     1051
         52000B CM USED
```

```
      1              SUBROUTINE CON1 (IC)
                C
                C     SEARCHES THE ARRAY ICODE OF LENGTH NOSCODE FOR THE INTEGER IC.
                C     THE ELEMENTS OF ICODE ARE ASSUMED TO BE IN ASCENDING ORDER.
      5         C     IC IS INPUT AS THE CODE, AND OUTPUT AS THE INDEX IN -ICODE- WHERE
                C     IT IS.
                C
                      COMMON/CON/ ICODE(350),IFAC(350),ABRS(350),NOSCODE
                C--   SET LIMITS OF ARRAY
     10               LO=1
                      NHI=NOSCODE
                C--   FIND MIDDLE OF ARRAY
                2     MID=(NHI+LO)/2
                C--   HAVE WE FOUND THE CORRECT CODE
     15               IF(IC.EQ.ICODE(MID)) GO TO 100
                C--   ERROR EXIT
                      IF(NHI.LE.LO) GO TO 200
                C--   CHECK WHICH HALF OF ARRAY CODE IS IN
                      IF(IC.LT.ICODE(MID)) GO TO 130
     20               LO=MID+1
                      GO TO 2
                130   NHI=MID-1
                      GO TO 2
                100   IC=MID
     25               RETURN
                200   WRITE(61,210) IC
                210   FORMAT(1X,*COULD NOT FIND CODE *,I3,* IN CODES TABLE*)
                      STOP
                      END
```

SYMBOLIC REFERENCE MAP (R=1)

ENTRY POINTS
3 CON1

VARIABLES	SN	TYPE		RELOCATION						
1274	ABRS	REAL	ARRAY	CON	0	IC	INTEGER		F.P.
0	ICODE	INTEGER	ARRAY	CON	536	IFAC	INTEGER	ARRAY	CON
43	LO	INTEGER			45	MID	INTEGER		
44	NHI	INTEGER			2032	NOSCODE	INTEGER		CON

FILE NAMES	MODE
TAPE61	FMT

STATEMENT LABELS

10	2			23	100				
25	200			34	210	FMT		20	130

COMMON BLOCKS	LENGTH
CON	1051

STATISTICS

PROGRAM LENGTH	468	38
CM LABELED COMMON LENGTH	2033B	1051

52000B CM USED

```
      SUBROUTINE SELECT (LAKE,PHIM,GM,A,B)
C
C     THIS PROGRAM SELECTS THE DESIRED LAKE AND SETS THE CONSTANTS
C     RELATED TO THAT LAKE.
C
      DIMENSION A(5),B(5)
      COMMON /VARS/ XSTAT(200),YSTAT(200),LIN,DLAT
C
      IF (LAKE.LT.0.OR.LAKE.GT.5) GO TO 60
      LAKE = LAKE+1
      GO TO (10,20,30,40,60,50), LAKE
C
CC    LAKE ONTARIO
CC    2 KM. GRID SIZE
CC
C
 10   PHIM = 43.1643
      GM = 79.02
      A(1) = 81.3221
      A(2) = 2.4294
      A(3) = -1.3349
      B(1) = -1.7669
      B(2) = 111.1010
      B(4) = 0.4054
      WRITE (61,70)
      RETURN
C
CC    LAKE ERIE
CC    2 KM. GRID SIZE
CC
C
 20   PHIM = 40.9700
      GM = 82.9035
      A(1) = 74.0161
      A(2) = 52.9979
      A(3) = -1.1525
      A(4) = 0.2210
      B(1) = -40.1422
      B(2) = 97.6373
      B(3) = 0.5957
      B(4) = 0.4291
      WRITE (61,80)
      RETURN
C
CC    LAKE HURON
CC    4 KM. GRID SIZE
C
 30   IF(DLAT.EQ.2.0) GO TO 32
      PHIM = 42.9266
      GM = 84.0560
      A(1) = 81.6400
      A(2) = 2.0300
      A(3) = -1.3471
      B(1) = -2.0451
      B(2) = 111.1110
      B(4) = 0.4054
      WRITE (61,90)
      RETURN
C     2 KM. GRID SIZE
 32   PHIM=42.9661
      GM=84.6621
      A(1)=81.5869
      A(2)=2.5757
      A(3)=-1.3471
      B(1)=-1.8561
      B(2)=111.1110
      B(4)=0.4054
      WRITE(61,91)
      RETURN
C
CC    LAKE SUPERIOR
CC    4 KM. GRID SIZE
C
 40   IF(DLAT.EQ.2.0) GO TO 42
      IF(DLAT.EQ.8.0) GO TO 48
      PHIM = 46.2826
      GM = 92.1000
      A(1) = 77.0726
      A(2) = 5.0423
```

```
                      A(3) = -1.4249
                      B(1) = -3.9863
      80              B(2) = 111.1760
                      B(4) = 0.486127
                      WRITE (61,100)
                      RETURN
                C     2 KM. GRID SIZE
      85         42   PHIM=46.3185
                      GM=92.1020
                      A(1)=77.0215
                      A(2)=5.8462
                      A(3)=-1.4249
      90              B(1)=-3.9889
                      B(2)=111.1760
                      B(4)=.4861
                      WRITE(61,102)
                      RETURN
      95        C     4 KM GRID SIZE
                46    PHIM=46.2311
                      GM=92.5109
                      A(1)=77.1459
                      A(2)=6.4278
     100              A(3)=-1.4249
                      B(1)=-4.3858
                      B(2)=111.1760
                      B(4)=0.4861
                      WRITE(61,100)
     105              RETURN
                C
                CC    GEORGIAN BAY
                C
                 50   PHIM=44.4752
     110              GM=82.3226
                      A(1)=79.5539
                      A(2)=-8.5757
                      A(3) = -1.3471
                      B(1)=8.4149
     115              B(2) = 111.1110
                      B(4) = 0.4854
                      WRITE (61,110)
                      RETURN
                C
     120         60   WRITE (61,120)
                      STOP 416
                C
                CC
                C
     125         70   FORMAT(/10X,*LAKE ONTARIO(2KM.) IS BEING STUDIED*)
                 80   FORMAT(/10X,*LAKE ERIE(2KM.) IS BEING STUDIED*)
                 90   FORMAT(/10X,*LAKE HURON(4KM.) IS BEING STUDIED*)
                 91   FORMAT(/10X,*LAKE HURON(2KM.) IS BEING STUDIED*)
                100   FORMAT(/10X,*LAKE SUPERIOR(4KM.) IS BEING STUDIED*)
     130        102   FORMAT(/10X,*LAKE SUPERIOR(2KM.) IS BEING STUDIED*)
                100   FORMAT(/10X,*LAKE SUPERIOR(8KM.) IS BEING STUDIED*)
                110   FORMAT(/10X,*GEORGIAN BAY(2KM.) IS BEING STUDIED*)
                120   FORMAT(/2X,*ERROR IN LAKE CODE*)
                      END
```

SYMBOLIC REFERENCE MAP (R=1)

ENTRY POINTS
3 SELECT

VARIABLES	SN	TYPE		RELOCATION					
0	A	REAL	ARRAY	F.P.	0	B	REAL	ARRAY	F.P.
621	DLAT	REAL		VARS	0	GM	REAL		F.P.
0	LAKE	INTEGER		F.P.	620	LIN	INTEGER		VARS
0	PHIM	REAL		F.P.	0	XSTAT	REAL	ARRAY	VARS
310	YSTAT	REAL	ARRAY	VARS					

FILE NAMES	MODE
TAPE61	FMT

STATEMENT LABELS

23	10			44	20			67	30		
112	32			133	40			157	42		
200	48			221	50			242	60		
300	70	FMT		306	80	FMT		314	90	FMT	
322	91	FMT		330	100	FMT		336	102	FMT	
344	108	FMT		352	110	FMT		360	120	FMT	

COMMON BLOCKS LENGTH
VARS 482

STATISTICS
PROGRAM LENGTH 472B 314
CM LABELED COMMON LENGTH 622B 482
52000B CM USED

```
      SUBROUTINE BATHY
C
C     THIS S/R READS IN THE BATHYMETRY AND SETS THE ZONE AND MEAN
C     DEPTH FOR EACH CELL IN THE LAKE.
C
      COMMON /MAP/ NO(300),IROW,ICOLMN,IZBO(300),NHYP(20,25)
      COMMON /IN/ KDM,DEPTH(24),NOUT,KOUT(20),IZONES
C
      CALL ZEROV (NHYP,500)
C
C     READ IN THE BATHYMETRY DATA FROM DISC.
C
      DO 40 I=1,ICOLMN
      READ (30) (IZBO(N),N=1,IROW)
      DO 30 J=1,IROW
C
C     SET THE MEAN DEPTH FOR EACH CELL.
C
      IXBO = MOD(IZBO(J),1000)
      IF (IXBO.NE.0) GO TO 10
      NO(J) = 0
      GO TO 30
   10 ZW = FLOAT(IXBO)
C
C     DETERMINE THE ZONE FOR EACH CELL.
C
      NC = IZBO(J)/1000
      NO(J) = NC
C
C     RESET THOSE CELLS WHICH ARE FOUND IN THE EXCLUDED ZONES TO ZERO.
C
      IF(NOUT.EQ.0) GO TO 11
      DO 12 L=1,NOUT
      IF(NC.EQ.KOUT(L)) NO(J)=0
      IF(NC.EQ.KOUT(L)) GO TO 30
   12 CONTINUE
C
C     NHYP(STANDARD DEPTH NO.,ZONE NO.) = TOTAL NUMBER OF GRID CELLS AT
C                                         EACH STANDARD DEPTH IN EACH ZONE
C     ZONE 25 = WHOLE LAKE
C
   11 DO 20 KD=1,KDM
      IF (ZW.LT.DEPTH(KD)) GO TO 30
      NHYP(KD,NC) = NHYP(KD,NC)+1
      NHYP(KD,25) = NHYP(KD,25)+1
   20 CONTINUE
   30 CONTINUE
C
C     WRITE THE ZONES FOR EACH CELL IN THE LAKE ONTO A SCRATCH FILE.
C
      WRITE (35) (NO(L),L=1,IROW)
   40 CONTINUE
      END FILE 35
      RETURN
      END
```

SYMBOLIC REFERENCE MAP (R=1)

ENTRY POINTS
1 BATHY

VARIABLES	SN	TYPE		RELOCATION					
1	DEPTH	REAL	ARRAY	IN	107	I	INTEGER		
455	ICOLMN	INTEGER		MAP	454	IROW	INTEGER		MAP
112	IXBO	INTEGER			456	IZBO	INTEGER	ARRAY	MAP
56	IZONES	INTEGER		IN	111	J	INTEGER		
116	KD	INTEGER			0	KDM	INTEGER		IN
32	KOUT	INTEGER	ARRAY	IN	115	L	INTEGER		
110	N	INTEGER			114	NC	INTEGER		
1132	NHYP	INTEGER	ARRAY	MAP	0	NO	INTEGER	ARRAY	MAP
31	NOUT	INTEGER		IN	113	ZW	REAL		

```
FILE NAMES          MODE
      TAPE30        UNFMT                    TAPE35    UNFMT

EXTERNALS           TYPE    ARGS
      ZEROV                   2

INLINE FUNCTIONS    TYPE    ARGS
      FLOAT         REAL       1  INTRIN                    MOD       INTEGER    2  INTRIN

STATEMENT LABELS
   21  10                                        42  11                                  0  12
    0  20                                        55  30                                  0  40

LOOPS  LABEL    INDEX      FROM-TO    LENGTH    PROPERTIES
    5  40        I           13 52       63B              EXT REFS  NOT INNER
   13  30        J           15 47       45B              NOT INNER
   31  12        L           33 36       11B        OPT     EXITS
   43  20        KD          42 46       12B        OPT     EXITS

COMMON BLOCKS   LENGTH
      MAP          1102
      IN             47

STATISTICS
  PROGRAM LENGTH                    117B       79
  CM LABELED COMMON LENGTH         2175B     1149
          52000B CM USED
```

```
      SUBROUTINE REPORT(IP,NUMPAR)
C
      DIMENSION IVAR(3)
      COMMON /CON/ ICODE(350),IFAC(350),ABRS(350),NOSCODE
      COMMON /STAT/ ICRN,INCODE(50),TH(20,200),NSTP(200),ACTST(200),
     1              NACT,PAR(25,51)
C
CC    TH(STANDARD DEPTH,PSN)=INTERPOLATED PARAMETER VALUE
C
      DO 10 L=1,20
      DO 10 M=1,200
      TH(L,M)=-1.0
10    CONTINUE
      NP1=NUMPAR+1
      WRITE(61,11)
11    FORMAT(* PSN*)
      IN=0
      INP=0
      CALL ZEROV(NSTP,200)
C
CC    READ THE INFORMATION FOR EACH STATION FROM THE SCRATCH FILE
CC
9     READ(1) PERM,((PAR(J,K),J=1,25),K=1,NP1)
      IF (EOF(1).NE.0) GO TO 12
C
CC    INTERPOLATE THE PARAMETER VALUES TO THE STANDARD DEPTHS
C
      INP=INP+1
      IN=IN+1
      CALL INTRPOL(IP,IN,NK)
C
CC    NSTP IS A LIST OF STATIONS (ACTUALLY COUNTERS FOR THE ORIGINAL LIST
CC    OF STATIONS) THAT HAVE DATA FOR THIS PARAMETER CODE.
C
      IF (NK.GT.0) NSTP(IN)=INP
C
CC    PRINT OUT THE INTERPOLATED VALUES FOR ONE PARAMETER
C
      IF (NUMPAR.GT.1) GO TO 50
      IC=INCODE(1)
      IF (ICODE(IC).NE.100.AND.ICODE(IC).NE.104) GO TO 50
      IF (NK.GT.0) WRITE(61,55) PERM,(TH(K,IN),K=1,NK)
55    FORMAT(1X,A3,2X,20(1X,F5.2))
      GO TO 9
50    IC=INCODE(IP)
      IF(IFAC(IC).EQ.99) GO TO 70
      ENCODE(30,60,IVAR(1)) IFAC(IC)
60    FORMAT(19H(1X,A3,2X,20(1X,F5.,I1,2H)),8X)
      IF (NK.GT.0) WRITE(61,IVAR) PERM,(TH(K,IN),K=1,NK)
      GO TO 9
70    IF(NK.GT.0) WRITE(61,75)PERM,(TH(K,IN),K=1,NK)
75    FORMAT(1X,A3,2X,15(1X,E7.2),/6X,5(1X,E7.2))
      GO TO 9
C
C     FILE NUMBER 2 CONTAINS THE ACTUAL OBSERVATIONS AND THEIR DEPTHS
C     AT EACH STATION (FOR ONE PARAMETER ONLY)
C
12    ENDFILE 2
      REWIND 2
      RETURN
      END
```

CARD NR. SEVERITY DETAILS DIAGNOSIS OF PROBLEM

52 I 32 CD 52 FIELD WIDTH OF A CONVERSION DESCRIPTOR SHOULD BE AS LARGE AS THE MINIMUM SPECIFIED FOR THAT DESCRIPTOR.
52 I 47 CD 52 FIELD WIDTH OF A CONVERSION DESCRIPTOR SHOULD BE AS LARGE AS THE MINIMUM SPECIFIED FOR THAT DESCRIPTOR.

SYMBOLIC REFERENCE MAP (R=1)

ENTRY POINTS
3 REPORT

VARIABLES	SN	TYPE		RELOCATION					
1274	ABRS	REAL	ARRAY	CON	10233	ACTST	REAL	ARRAY	STAT
236	IC	INTEGER			0	ICODE	INTEGER	ARRAY	CON
0	ICRN	INTEGER		STAT	536	IFAC	INTEGER	ARRAY	CON
230	IN	INTEGER			1	INCODE	INTEGER	ARRAY	STAT
231	INP	INTEGER			0	IP	INTEGER		F.P.
237	IVAR	INTEGER	ARRAY		233	J	INTEGER		
234	K	INTEGER			225	L	INTEGER		
226	M	INTEGER			10543	NACT	INTEGER		STAT
235	NK	INTEGER			2032	NOSCODE	INTEGER		CON
227	NP1	INTEGER			7723	NSTP	INTEGER	ARRAY	STAT
0	NUMPAR	INTEGER		F.P.	10544	PAR	REAL	ARRAY	STAT
232	PERM	REAL			63	TH	REAL	ARRAY	STAT

FILE NAMES	MODE				
TAPE1	UNFMT	TAPE2		TAPE61	FMT

EXTERNALS	TYPE	ARGS		
EOF	REAL	1	INTRPOL	3
ZEROV		2		

STATEMENT LABELS

30	9		0	10		146	11	FMT	
125	12		73	50		162	55	FMT	
172	60	FMT	114	70		211	75	FMT	

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
6	10	L	10 13	13B	NOT INNER
13	10	M	11 13	3B	OPT

COMMON BLOCKS	LENGTH
CON	1051
STAT	5727

STATISTICS

PROGRAM LENGTH	242B	162
CM LABELED COMMON LENGTH	15172B	6778

52000B CM USED

```
      SUBROUTINE INTRPOL(IP,IN,NK)
C
      DIMENSION PARAM(25), DEP(25)
      COMMON /STAT/ ICRN,INCODE(50),TH(20,200),NSTP(200),ACTST(200),
     1              NACT,PAR(25,51)
      COMMON /IN/ KDM,DEPTH(24),NOUT,KOUT(20),IZONES
      COMMON /CON/ ICODE(350),IFAC(350),ABRS(350),NOSCODE
C
CC    COMPRESS PROPERTY ARRAYS.
C
      N = 0
      NK = 1
      IC=INCODE(IP)
      IC=ICODE(IC)
      CALL ZEROV(PARAM,25)
      CALL ZEROV(DEP,25)
      DO 10 J=1,25
      IF (PAR(J,IP+1).EQ.-1.0) GO TO 10
      N = N+1
      PARAM(N) = PAR(J,IP+1)
      DEP(N) = PAR(J,1)
   10 CONTINUE
      TH(1,IN) = PARAM(1)
C
CC    WRITE THE ACTUAL PARAMETER OBSERVATIONS AND THEIR DEPTHS
CC    ONTO SCRATCH FILE 2
C
      IF (N.NE.0) WRITE(2) IN,PARAM,DEP
C
CC    INTERPOLATE A SINGLE VALUE FROM TOP TO BOTTOM IF THE PARAMETER
CC    IS NOT AN INTEGRATED ONE.
C
      IF (N.EQ.1.AND.(IC.EQ.225.OR.IC.EQ.267.OR.IC.EQ.613.OR.
     1  IC.EQ.614.OR.IC.EQ.124)) RETURN
      IF (N.NE.0) GO TO 1
      IN=IN-1
      NK=0
      RETURN
1     IF (N.NE.1) GO TO 15
      N=2
      PARAM(2)=PARAM(1)
      DEP(2)=DEP(1)
C
CC    CALCULATE THE INTERPOLATED VALUES FOR THE PARAMETER AT THE
CC    STANDARD DEPTHS.
C
   15 CONTINUE
      J = 1
      DO 110 L=2,KDM
      NK = L
   40 TH(L,IN) = PARAM(J)
      IF (DEP(J).EQ.DEPTH(L)) GO TO 110
      IF (DEP(J).GT.DEPTH(L)) GO TO 50
      J = J+1
      IF(J.LE.N) GO TO 40
      TH(L,IN)=-1.0
      NK=NK-1
      RETURN
C
CC    PROPERTY-DEPTH INTERPOLATION
C
   50 IF (J.EQ.1) GO TO 110
      TH(L,IN) = PARAM(J-1)+(PARAM(J)-PARAM(J-1))*(DEPTH(L)
     $           -DEP(J-1))/(DEP(J)-DEP(J-1))
  110 CONTINUE
      RETURN
      END
```

SYMBOLIC REFERENCE MAP (R=1)

ENTRY POINTS
3 INTRPOL

VARIABLES	SN	TYPE	RELOCATION						
1274	ABRS	REAL	ARRAY	CON	10233	ACTST	REAL	ARRAY	STAT
176	DEP	REAL	ARRAY		1	DEPTH	REAL	ARRAY	IN
142	IC	INTEGER			0	ICODE	INTEGER	ARRAY	CON
0	ICRN	INTEGER		STAT	536	IFAC	INTEGER	ARRAY	CON
0	IN	INTEGER		F.P.	1	INCODE	INTEGER	ARRAY	STAT
0	IP	INTEGER		F.P.	56	IZONES	INTEGER		IN
143	J	INTEGER			0	KDM	INTEGER		IN
32	KOUT	INTEGER	ARRAY	IN	144	L	INTEGER		
141	N	INTEGER			10543	NACT	INTEGER		STAT
0	NK	INTEGER		F.P.	2032	NOSCODE	INTEGER		CON
31	NOUT	INTEGER		IN	7723	NSTP	INTEGER	ARRAY	STAT
10544	PAR	REAL	ARRAY	STAT	145	PARAM	REAL	ARRAY	
63	TH	REAL	ARRAY	STAT					

FILE NAMES	MODE
TAPE2	UNFMT

EXTERNALS	TYPE	ARGS
ZEROU		2

STATEMENT LABELS

56	1	30	10	64	15		
70	40	105	50	117	110		

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
24	10	J	17 22	5B	OPT
66	110	L	49 65	34B	

COMMON BLOCKS	LENGTH
STAT	5727
IN	47
CON	1051

STATISTICS

PROGRAM LENGTH	234B	156
CM LABELED COMMON LENGTH	15251B	6825

520030B CM USED

```
      1                 SUBROUTINE FILL
                C
                C       S/R FILL ASSIGNS A STATION NUMBER TO EACH CELL IN THE LAKE.
                C
      5                 COMMON /VARS/ XSTAT(200),YSTAT(200),LIN,DLAT
                        COMMON /MAP/ NO(300),IROW,ICOLMN,IZBO(300),NHYP(20,25)
                        COMMON /STAT/ ICRN,INCODE(50),TH(20,200),NSTP(200),ACTST(200),
                       1              NACT,PAR(25,51)
                C
     10                 DL2=DLAT/2.0
                        DO 50 J=1,ICOLMN
                        READ (35) (NO(I),I=1,IROW)
                        YO=J*DLAT-DL2
                        DO 40 I=1,IROW
     15                 XO=I*DLAT-DL2
                        IF (NO(I).EQ.0) GO TO 40
                        DISTO=1000000.0
                        DO 30 K=1,LIN
                        L=NSTP(K)
     20                 IF (L.EQ.0) GO TO 30
                        DX=XSTAT(L)-XO
                        DY=YSTAT(L)-YO
                        D2=DX*DX+DY*DY
                        IF(D2-DISTO) 20,30,30
     25                 C
                        C  FOUND A CLOSER STATION
                        C
                   20   DISTO=D2
                        KNEAR = K
     30                 CONTINUE
                        NO(I) = KNEAR
                   40   CONTINUE
                        WRITE (36) (NO(I),I=1,IROW)
                   50   CONTINUE
     35                 REWIND 35
                        REWIND 36
                        RETURN
                        END
```

SYMBOLIC REFERENCE MAP (R=1)

ENTRY POINTS
1 FILL

VARIABLES	SN	TYPE		RELOCATION						
10233	ACTST	REAL	ARRAY	STAT	110	DISTO	REAL			
621	DLAT	REAL		VARS	103	DL2	REAL			
113	DX	REAL			114	DY	REAL			
115	D2	REAL			105	I	INTEGER			
455	ICOLMN	INTEGER		MAP	0	ICRN	INTEGER			STAT
1	INCODE	INTEGER	ARRAY	STAT	454	IROW	INTEGER			MAP
456	IZBO	INTEGER	ARRAY	MAP	104	J	INTEGER			
111	K	INTEGER			116	KNEAR	INTEGER			
112	L	INTEGER			620	LIN	INTEGER			VARS
10543	NACT	INTEGER		STAT	1132	NHYP	INTEGER	ARRAY		MAP
0	NO	INTEGER	ARRAY	MAP	7723	NSTP	INTEGER	ARRAY		STAT
10544	PAR	REAL	ARRAY	STAT	63	TH	REAL	ARRAY		STAT
107	XO	REAL			0	XSTAT	REAL	ARRAY		VARS
106	YO	REAL			310	YSTAT	REAL	ARRAY		VARS

FILE NAMES	MODE		
TAPE35	UNFMT	TAPE36	UNFMT

STATEMENT LABELS

0	20	INACTIVE	43	30	47	40	
0	50						

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
5	50	J	11 34	558	EXT REFS NOT INNER
17	40	I	14 32	338	NOT INNER
38	30	K	18 30	148	OPT

```
COMMON BLOCKS    LENGTH
       VARS         402
       MAP        1102
       STAT       5727

STATISTICS
  PROGRAM LENGTH                  117B      79
  CM LABELED COMMON LENGTH      16077B    7231
       52000B CM USED
```

```
      SUBROUTINE INTEGRT(IC)
C
C     THIS S/R INTEGRATES THE FOLLOWING AVERAGES:
C     LAYER AND INTEGRATED QUANTITY, LAYER AND INTEGRATED VOLUME,
C     AND VOLUME WEIGHTED VALUES FOR LAYER AND COLUMN.
C
      DIMENSION INACT(200),THSUM(20,25),NSUM(20,25),XNOB(25),DEP(25)
      DIMENSION NZ(200,17),ACTOB(500),ACTDP(500),ACSN(500)
      COMMON /MAP/ NO(300),IROW,ICOLMN,IZBO(300),NHYP(20,25)
      COMMON /IN/ KDM,DEPTH(24),NOUT,KOUT(20),IZONES
      COMMON /STAT/ ICRN,INCODE(50),TH(20,200),NSTP(200),ACTST(200),
     1              NACT,PAR(25,51)
      COMMON /VARS/ XSTAT(200),YSTAT(200),LIN,DLAT
      COMMON /CON/ ICODE(350),IFAC(350),ABRS(350),NOSCODE
      COMMON /SUM/ WAREA(25),Z17(5),Z25(5),IDZ17(5),IDZ25(5),
     1  QUANTT,I17,I25
      EQUIVALENCE(TH,NZ)
C
      PRINT 75
      LINE=0
      CALL ZEROV (THSUM,500)
      CALL ZEROV (NSUM,500)
      DO 300 M=1,ICOLMN
      READ (35) (IZBO(I),I=1,IROW)
      IF (EOF(35).NE.0) STOP 111
      READ (36) (NO(I),I=1,IROW)
      IF (EOF(36).NE.0) STOP 222
      DO 200 L=1,IROW
      IF (IZBO(L).EQ.0) GO TO 200
      NC = IZBO(L)
      INS = NO(L)
      DO 10 K=1,KDM
      IF (TH(K,INS).EQ.-1.0) GO TO 200
      THSUM(K,NC) = THSUM(K,NC)+TH(K,INS)
      NSUM(K,NC) = NSUM(K,NC)+1
   10 CONTINUE
  200 CONTINUE
  300 CONTINUE
      REWIND 35
      REWIND 36
      CALL ZEROV(NZ,3400)
      CALL ZEROV(INACT,200)
C
C     COMPUTE TOTALS FOR EACH DEPTH LAYER K FOR EACH ZONE.
C
      DO 30 M=1,ICOLMN
C  READ ZONE ASSIGNED TO EACH CELL
      READ (35) (IZBO(I),I=1,IROW)
      IF (EOF(35).NE.0) STOP 111
C  READ STATION ASSIGNED TO EACH CELL
      READ (36) (NO(I),I=1,IROW)
      IF (EOF(36).NE.0) STOP 222
      DO 20 L=1,IROW
      IF (IZBO(L).EQ.0) GO TO 20
      NC = IZBO(L)
      INS = NO(L)
      NS=NSTP(INS)
C
C     NZ CONTAINS UP TO 17 ZONES INFLUENCED BY STATION NS. (THE VALUES
C     AT STATION NS ARE INCLUDED IN CALCULATIONS FOR ZONE NC, SINCE THE
C     STATION IS WITHIN OR CLOSE TO THE ZONE)
C
      DO 9 I=1,17
      IF (NZ(NS,I).EQ.NC) GO TO 8
    9 CONTINUE
      DO 11 I=1,17
      IF (NZ(NS,I).NE.0) GO TO 11
      NZ(NS,I)=NC
      GO TO 8
   11 CONTINUE
    8 CONTINUE
      DO 15 IN=1,LIN
      KIN=NSTP(IN)
      IF (KIN.EQ.0) GO TO 15
      NX=XSTAT(KIN)/DLAT+0.5
      NY=YSTAT(KIN)/DLAT+0.5
      IF (NX.NE.L) GO TO 15
```

```
                IF (NY.NE.M) GO TO 15
              C
   80         C  STORE THE ZONE NC THAT THE STATION NS IS IN
              C
                INACT(NS)=NC
              15  CONTINUE
               20 CONTINUE
   85          30 CONTINUE
               40 J = J+1
              C
              C    COMPUTE AREA WEIGHTED VALUES FOR EACH DEPTH IN ZONE J
   90         C
                DO 50 I=1,KDM
                IF (NSUM(I,J).EQ.0) GO TO 60
                THSUM(I,J) = THSUM(I,J)/NSUM(I,J)
                THSUM(I,25) = THSUM(I,25)+THSUM(I,J)*NHYP(I,J)
   95           50 NSUM(I,25) = NSUM(I,25)+NHYP(I,J)
              C
                I = KDM+1
               60 MAXD = I-1
              C
  100         C
              C     PRINT OUT THE ZONE NUMBER THAT HAS BEEN ELIMINATED
              C
                IF(MAXD.GE.1) GO TO 70
                PRINT 61,J
               61 FORMAT(1H0//6X,5HZONE ,I2,28H HAS BEEN ELIMINATED)
  105           LINE=LINE+4
                IF(J-IZONES) 40,120,150
               70 QUANT = 0.
                VOL = 0.
                NOB5=0
  110           IF (LINE.LT.72) GO TO 71
                LINE=1
                PRINT 75
              75  FORMAT(1H1)
              71  PRINT 159
  115         159 FORMAT(1H0,135(1H-))
              C
              C  PRINT THE TITLES FOR THE ZONE REPORT
              C
                PRINT 160, ICRN,J,ABRS(IC),ICODE(IC),DEPTH(1),
  120          $THSUM(1,J),NHYP(1,J),QUANT,VOL
              160  FORMAT(1H0,7HCRUISE ,A7,5X,11HZONE NUMBER,I4,/1H0,
                $10HPARAMETER ,A4,1H(,I4,2H )//5X,5HDEPTH,5X,13HAREA WEIGHTED,
                $8X,4HAREA,10X,5HLAYER,7X,11HINTEGRATED ,7X,5HLAYER,7X,
                $11HINTEGRATED ,7X,22HVOLUME WEIGHTED VALUES/16X,10HMEAN VALUE,22X,
  125           $8HQUANTITY,7X,8HQUANTITY,9X,6HVOLUME,9X,6HVOLUME,9X,5HLAYER,9X,
                $6HCOLUMN//4X,F6.2,6X,F11.4,7X,I6,22X,E11.3,19X,E11.3)
                LINE=LINE+11
                IF (LINE.LE.72) GO TO 79
                LINE=0
  130           PRINT 111
              C
              79  M = MAXD
               80 IF (THSUM(M,J).EQ.0.0) GO TO 90
                IF (NHYP(M,J).EQ.0.OR.MAXD.EQ.KDM) GO TO 100
  135           M = M+1
                MAXD = M
                GO TO 80
               90 MAXD = M-1
              100 ICHECK=0
  140           DO 110 M=2,MAXD
                IF(NHYP(M,J).EQ.0) ICHECK=ICHECK+1
                IF (ICHECK.EQ.2) GO TO 117
                DELC = DEPTH(M)-DEPTH(M-1)
                DELQ = (NHYP(M,J)*THSUM(M,J)+NHYP(M-1,J)*THSUM(M-1,J)+(NHYP(M-1,J)
  145           $*THSUM(M,J)+NHYP(M,J)*THSUM(M-1,J))/2.)*DELC/3.
                QUANT = QUANT+DELQ
                DELV = (NHYP(M,J)+NHYP(M-1,J))*DELC/2.
                VOL = VOL+DELV
                QMEAN = DELQ/DELV
  150           QCOL = QUANT/VOL
                PRINT 170, DELQ,DELV,QMEAN,DEPTH(M),THSUM(M,J),NHYP(M,J),QUANT,VOL
                $,QCOL
              170  FORMAT (47X,E11.3,19X,E11.3,20X,F9.4/4X,F6.2,6X,F11.4,7X,I6,22X,2
                $(E11.4,19X),F10.4)
```

```
      C
            IF (DEPTH(M).EQ.1.0) WAREA(J)=THSUM(M,J)
            IF (DEPTH(M).EQ.1.0.AND.WAREA(J).EQ.0.0) WAREA(J)=THSUM(1,J)
            IF (J.NE.I17) GO TO 101
            DO 103 I=1,5
            IF (IDZ17(I).EQ.M) Z17(I)=THSUM(M,J)
            IF (M.EQ.MAXD.AND.IDZ17(I).EQ.0) Z17(I-1)=THSUM(M,J)
  103       CONTINUE
  101       IF (J.NE.I25) GO TO 102
            DO 104 I=1,5
            IF (IDZ25(I).EQ.M) Z25(I)=THSUM(M,J)
            IF (M.EQ.MAXD.AND.IDZ25(I).EQ.0) Z25(I-1)=THSUM(M,J)
  104       CONTINUE
            IF (M.EQ.MAXD) QUANTT=VOL*THSUM(M,J)*1000.*(DLAT**2)
  102       CONTINUE
      C
            LINE = LINE+2
            IF (LINE.LE.72) GO TO 110
            LINE = 3
            PRINT 111
  111       FORMAT(1H1,4X,5HDEPTH,5X,13HAREA WEIGHTED,8X,4HAREA,10X,
     $5HLAYER,7X,11HINTEGRATED ,7X,5HLAYER,7X,11HINTEGRATED ,7X,
     $22HVOLUME WEIGHTED VALUES/16X,10HMEAN VALUE,22X,
     $8HQUANTITY,7X,8HQUANTITY,9X,6HVOLUME,9X,6HVOLUME,9X,5HLAYER,9X,
     $6HCOLUMN,/1H )
      C
  110       CONTINUE
            M = MAXD+1
            IF (THSUM(M,J).EQ.0.0.AND.NHYP(M,J).GT.0) PRINT 100, DEPTH(M),NHYP
     $(M,J)
  100       FORMAT (/4X,F6.2,24X,I6)
            LINE=LINE+2
            IF (J.EQ.25) GO TO 115
  117       IF (NACT.NE.1) GO TO 115
            CALL ZEROV(ACTOB,500)
            CALL ZEROV(ACTDP,500)
            CALL BLANKV(ACSN,500)
            REWIND 2
            DO 5 NST=1,200
      C
      C  READ THE ACTUAL PARAMETER VALUES AND THEIR DEPTHS FROM
      C  SCRATCH FILE 2 FOR EACH STATION
      C
            READ (2) IN,XNOB,DEP
            IF (EOF(2).NE.0) GO TO 45
            IF (IN.NE.NST) STOP
            NSTT=NSTP(NST)
            DO 6 NSZ=1,17
            IF (NZ(NSTT,NSZ).EQ.0) GO TO 5
            IF (NZ(NSTT,NSZ).EQ.J) GO TO 7
      6     CONTINUE
            GO TO 5
      7     CONTINUE
            DO 4 MM=1,25
      C
      C     THE VALUES AND DEPTHS OF ALL THE ACTUAL OBSERVATIONS AFFECTING THIS
      C     ZONE ARE IN ACTOB AND ACTDP.  NOBS IS THE NUMBER OF OBSERVATIONS.
      C
            IF (XNOB(MM).EQ.0.0) GO TO 4
            NOBS=NOBS+1
            ACTOB(NOBS)=XNOB(MM)
            ACTDP(NOBS)=DEP(MM)
            IF (INACT(NSTT).EQ.J) ENCODE(4,2,ACSN(NOBS)) ACTST(NSTT)
      2     FORMAT(A3,1H*)
            IF (INACT(NSTT).NE.J) ENCODE(4,3,ACSN(NOBS)) ACTST(NSTT)
      3     FORMAT(A3,1H )
      4     CONTINUE
      5     CONTINUE
      45    PRINT 113,NOBS,J
      113   FORMAT(/1H0,*THERE ARE *,I3,* OBSERVATIONS AFFECTING *,
     1  *CALCULATIONS IN ZONE *,I2,/1H0,*VALUES WITH A *,1H*,
     1  * ARE ACTUAL OBSERVATIONS IN THE ZONE*,/1H )
            LINE=LINE+6
            IF (LINE.LE.72) GO TO 114
            PRINT 75
            LINE=0
  114       NN=-12
```

```
                      IF (NOBS.EQ.0) GO TO 115
                1110  NN=NN+13
                      KN=NN+12
      235             IF (NOBS.LT.13) KN=KN-13+NOBS
                       PRINT 1112,(ACSN(I),I=NN,KN)
                1112  FORMAT(1H0,*PERMANENT*,11X,13(A4,5X))
                      PRINT 112,(ACTOB(I),I=NN,KN)
                 112  FORMAT(1H ,*STATION NO.*,/1H ,*VALUE*,10X,13(F9.4))
      240             PRINT 110,(ACTDP(I),I=NN,KN)
                 110  FORMAT(1H ,*DEPTH*,13X,13(F5.1,4X))
                      LINE=LINE+5
                      IF (LINE.LE.72) GO TO 116
                      LINE=0
      245             PRINT 75
                 116  NOBS=NOBS-13
                      IF (NOBS.GT.0) GO TO 1110
                 115  IF (J-IZONES) 40,120,150
                C
      250          120  DO 130 I=1,KDM
                        IF (NSUM(I,25).EQ.0) GO TO 140
                 130    THSUM(I,25) = THSUM(I,25)/NSUM(I,25)
                        I = KDM+1
                 140    MAXD = I-1
      255               J = 25
                        GO TO 70
                 150  IF(NOUT.NE.0) PRINT 190,(KOUT(L),L=1,NOUT)
                 190  FORMAT(//10X,27HTHE ZONES NOT INCLUDED ARE , I3,20(1H,,I3))
                      RETURN
      260             END
```

CARD NR. SEVERITY DETAILS DIAGNOSIS OF PROBLEM

237 I 43CD 237 TOTAL RECORD LENGTH IS GREATER THAN 137 CHARACTERS. IT MAY EXCEED THE I/O DEVICE CAPACITY.

SYMBOLIC REFERENCE MAP (R=1)

ENTRY POINTS
3 INTEGRT

VARIABLES	SN	TYPE		RELOCATION					
1274	ABRS	REAL	ARRAY	CON	5654	ACSN	REAL	ARRAY	
4670	ACTDP	REAL	ARRAY		3784	ACTOB	REAL	ARRAY	
10233	ACTST	REAL	ARRAY	STAT	1327	DELC	REAL		
1330	DELQ	REAL			1331	DELV	REAL		
3653	DEP	REAL	ARRAY		1	DEPTH	REAL	ARRAY	IN
621	DLAT	REAL		VARS	1307	I	INTEGER		
0	IC	INTEGER		F.P.	1326	ICHECK	INTEGER		
0	ICODE	INTEGER	ARRAY	CON	455	ICOLMN	INTEGER		MAP
0	ICRN	INTEGER		STAT	43	IDZ17	INTEGER	ARRAY	SUM
50	IDZ25	INTEGER	ARRAY	SUM	536	IFAC	INTEGER	ARRAY	CON
1315	IN	INTEGER			1342	INACT	INTEGER	ARRAY	
1	INCODE	INTEGER	ARRAY	STAT	1312	INS	INTEGER		
454	IROW	INTEGER		MAP	456	IZBO	INTEGER	ARRAY	MAP
56	IZONES	INTEGER		IN	56	I17	INTEGER		SUM
57	I25	INTEGER		SUM	1321	J	INTEGER		
1313	K	INTEGER			0	KDM	INTEGER		IN
1316	KIN	INTEGER			1341	KN	INTEGER		
32	KOUT	INTEGER	ARRAY	IN	1310	L	INTEGER		
620	LIN	INTEGER		VARS	1305	LINE	INTEGER		
1306	M	INTEGER			1322	MAXD	INTEGER		
1307	MM	INTEGER			10543	NACT	INTEGER		STAT
1311	NC	INTEGER			1132	NHYP	INTEGER	ARRAY	MAP
1340	NN	INTEGER			0	NO	INTEGER	ARRAY	MAP
1325	NOBS	INTEGER			2032	NOSCODE	INTEGER		CON
31	NOUT	INTEGER		IN	1314	NS	INTEGER		
1334	NST	INTEGER			7723	NSTP	INTEGER	ARRAY	STAT
1335	NSTT	INTEGER			2636	NSUM	INTEGER	ARRAY	
1336	NSZ	INTEGER			1317	NX	INTEGER		
1320	NY	INTEGER			63	NZ	INTEGER	ARRAY	STAT

64

VARIABLES	SN	TYPE	RELOCATION						
10544	PAR	REAL	ARRAY	STAT	1333	QCOL	REAL		
1332	QMEAN	REAL			1323	QUANT	REAL		
55	QUANTT	REAL		SUM	63	TH	REAL	ARRAY	STAT
1652	THSUM	REAL	ARRAY		1324	VOL	REAL		
0	WAREA	REAL	ARRAY	SUM	3622	XNOB	REAL	ARRAY	
0	XSTAT	REAL	ARRAY	VARS	310	YSTAT	REAL	ARRAY	VARS
31	Z17	REAL	ARRAY	SUM	36	Z25	REAL	ARRAY	SUM

FILE NAMES	MODE							
OUTPUT	FMT	TAPE2	UNFMT		TAPE35	UNFMT	TAPE36	UNFMT

EXTERNALS	TYPE	ARGS				
BLANKV		2		EOF	REAL	1
ZEROV		2				

STATEMENT LABELS

1157	2	FMT	1166	3	FMT	556	4		
561	5		0	6		538	7		
150	8		0	9		0	10		
145	11		170	15		172	20		
0	30		201	40		564	45		
0	50		220	60		736	61	FMT	
231	70		240	71		767	75	FMT	
262	79		264	80		276	90		
300	100		407	101		442	102		
0	103		0	104		458	110		
1105	111	FMT	1234	112	FMT	1175	113	FMT	
574	114		641	115		636	116		
473	117		1246	118	FMT	644	120		
0	130		655	140		661	150		
774	159	FMT	1013	160	FMT	1072	170	FMT	
1140	180	FMT	1261	190	FMT	61	200		
0	300		576	1110		1224	1112	FMT	

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES			
15	300	M	23 30	52B		EXT REFS	NOT INNER	
40	200	L	28 37	24B		NOT INNER		
45	10	K	32 36	14B	OPT	EXITS		
100	30	M	46 85	100B		EXT REFS	NOT INNER	
123	20	L	53 84	52B		NOT INNER		
131	9	I	63 65	6B	OPT	EXITS		
140	11	I	66 78	10B	OPT	EXITS		
154	15	IN	72 83	15B	OPT			
283	50	I	91 95	13B	OPT	EXITS		
302	110	M	148 181	151B		EXT REFS	EXITS	NOT INNER
376	103	I	159 162	10B	OPT			
421	104	I	164 167	10B	OPT			
506	5	NST	193 222	56B		EXT REFS	EXITS	NOT INNER
521	6	NSZ	202 205	7B	OPT	EXITS		
531	4	MM	208 221	30B		EXT REFS		
645	130	I	250 252	6B	OPT	EXITS		

COMMON BLOCKS	LENGTH
MAP	1102
IN	47
STAT	5727
VARS	402
CON	1051
SUM	48

STATISTICS

PROGRAM LENGTH	66508	3496
CM LABELED COMMON LENGTH	202718	8377
520008 CM USED		

```
      SUBROUTINE SUMRY(ABR,ICD,LAKE,IYR,ID1,ID2,ICRN)
C
      COMMON /IN/ KDM,DEPTH(24),NOUT,KOUT(20),IZONES
      COMMON /SUM/ WAREA(25),Z17(5),Z25(5),IDZ17(5),IDZ25(5),
     1  QUANT,I17,I25
      DIMENSION NAME(2,6)
C
      DATA NAME/10HLAKE ONTAR,2HIO,10HLAKE ERIE ,1H ,
     1          10HLAKE HURON,1H ,10HLAKE SUPER,3HIOR,
     1          10HLAKE CODE ,5HERROR,10HGEORGIAN B,2HAY/
C
      WRITE(61,1) IYR,NAME(1,LAKE),NAME(2,LAKE),ABR,ICD,ICRN,ID1,ID2
    1 FORMAT(1H0,10X,2H19,I2,5X,A10,A5,10X,*PARAMETER: *,A4,
     1  2H (,I3,1H),/1H ,44X,*DEPTH: 1.0*,/1H0,120(1H-),
     1  /1H ,*CRUISE*,7X,A7,/1H ,120(1H-),
     1  /1H ,*CRUISE    *,3X,A10,/1H ,*DATES     TO*,A10)
      WRITE(4,12) IYR,NAME(1,LAKE),NAME(2,LAKE),ABR,ICD,ID1,ID2,ICRN
   12 FORMAT(I2,A10,A5,A4,I3,2A10,A7)
      WRITE(61,6)
      WRITE(4,13)
   13 FORMAT(1H ,23(1H-))
C
      DO 2 I=1,IZONES
      IF (NOUT.EQ.0) GO TO 4
      DO 3 J=1,NOUT
      IF (KOUT(J).EQ.I) GO TO 2
    3 CONTINUE
    4 WRITE(61,5) I,WAREA(I)
    5 FORMAT(1H0,I6,F13.4)
      WRITE(4,5) I,WAREA(I)
    2 CONTINUE
      WRITE(61,6)
    6 FORMAT(1H ,120(1H-))
      WRITE(4,13)
      I=25
      WRITE(61,5) I,WAREA(I)
      WRITE(4,5) I,WAREA(I)
      WRITE(61,6)
      WRITE(4,13)
C
C  SKIP REST OF SUMMARY REPORT FOR INTEGRATED PARAMETERS
C
      IF (ICD.EQ.225.OR.ICD.EQ.267.OR.ICD.EQ.613.OR.ICD.EQ.614
     1  .OR.ICD.EQ.124) GO TO 15
C
      IF (I17.EQ.0) GO TO 10
C
      DO 8 I=1,5
      M=IDZ17(I)
      IF (M.EQ.KDM) WRITE(61,9) Z17(I)
      IF (M.EQ.KDM) WRITE(4,9) Z17(I)
    9 FORMAT(1H0,*  BOTTOM*,F11.4)
      IF (M.EQ.KDM) GO TO 10
      IF (M.EQ.0) WRITE(61,9) Z17(I-1)
      IF (M.EQ.0) WRITE(4,9) Z17(I-1)
      IF (M.EQ.0) GO TO 10
      IF (I.EQ.1) WRITE(61,7) I17,DEPTH(M),Z17(I)
    7 FORMAT(1H0,I2,F5.0,1HM,F11.4)
      IF (I.EQ.1) WRITE(4,7) I17,DEPTH(M),Z17(I)
      IF (I.NE.1) WRITE(61,11) DEPTH(M),Z17(I)
   11 FORMAT(1H0,7X,F5.0,1HM,F11.4)
      IF (I.NE.1) WRITE(4,11) DEPTH(M),Z17(I)
    8 CONTINUE
C
   10 IF (I25.EQ.0) GO TO 15
C
      DO 20 I=1,5
      M=IDZ25(I)
      IF (M.EQ.KDM) WRITE(61,9) Z25(I)
      IF (M.EQ.KDM) WRITE(4,9) Z25(I)
      IF (M.EQ.KDM) GO TO 21
      IF (M.EQ.0) WRITE(61,9) Z25(I-1)
      IF (M.EQ.0) WRITE(4,9) Z25(I-1)
      IF (M.EQ.0) GO TO 21
      IF (I.EQ.1) WRITE(61,7) I25,DEPTH(M),Z25(I)
      IF (I.EQ.1) WRITE(4,7) I25,DEPTH(M),Z25(I)
      IF (I.NE.1) WRITE(61,11) DEPTH(M),Z25(I)
```

```
                      IF (I.NE.1) WRITE(4,11) DEPTH(M),Z25(I)
                20    CONTINUE
          80          C
                21    WRITE(61,6)
                      WRITE(4,13)
                      C
                      C  QUANTITY IS MEANINGLESS FOR SOME PARAMETERS
          85          C
                      IF (ICD.EQ.184.OR.ICD.EQ.168.OR.ICD.EQ.247) GO TO 15
                      C
                      WRITE(61,22) QUANT
                22    FORMAT(1H0,*QUANTITY*,1PE11.2,4H KG.)
          90          WRITE(4,14) QUANT
                14    FORMAT(1H0,*QUANTITY*,1PE11.2,4H KG.)
                15    ENDFILE 4
                      C
                      DO 23 I=1,5
          95          Z17(I)=0.
                      Z25(I)=0.
                23    CONTINUE
                      QUANT=0.
                      C
         100          RETURN
                      END
```

SYMBOLIC REFERENCE MAP (R=1)

ENTRY POINTS
3 SUMRY

VARIABLES	SN	TYPE		RELOCATION					
0	ABR	REAL		F.P.	1	DEPTH	REAL	ARRAY	IN
641	I	INTEGER			0	ICD	INTEGER		F.P.
0	ICRN	INTEGER		F.P.	43	IDZ17	INTEGER	ARRAY	SUM
50	IDZ25	INTEGER	ARRAY	SUM	0	ID1	INTEGER		F.P.
0	ID2	INTEGER		F.P.	0	IYR	INTEGER		F.P.
56	IZONES	INTEGER		IN	56	I17	INTEGER		SUM
57	I25	INTEGER		SUM	642	J	INTEGER		
0	KDM	INTEGER		IN	32	KOUT	INTEGER	ARRAY	IN
0	LAKE	INTEGER		F.P.	643	M	INTEGER		
644	NAME	INTEGER	ARRAY		31	NOUT	INTEGER		IN
55	QUANT	REAL		SUM	0	WAREA	REAL	ARRAY	SUM
31	Z17	REAL	ARRAY	SUM	36	Z25	REAL	ARRAY	SUM

FILE NAMES	MODE		
TAPE4	FMT	TAPE61	FMT

STATEMENT LABELS

341	1	FMT	45	2		0	3		
35	4		420	5	FMT	433	6	FMT	
513	7	FMT	0	8		471	9	FMT	
200	10		532	11	FMT	376	12	FMT	
410	13	FMT	633	14	FMT	314	15		
0	20		276	21		622	22	FMT	
0	23								

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES		
26	2	I	23 31	22B		EXT REFS	NOT INNER
38	3	J	25 27	5B	OPT	EXITS	
184	8	I	48 63	74B		EXT REFS	EXITS
282	20	I	67 79	74B		EXT REFS	EXITS
321	23	I	94 97	3B	OPT		

COMMON BLOCKS	LENGTH
IN	47
SUM	48

STATISTICS

PROGRAM LENGTH	660B	432
CM LABELED COMMON LENGTH	137B	95

520000B CM USED

```
      SUBROUTINE ATTS2K(IDBN,IPACKF,IPACKN,IUSER)
C
C     THIS ROUTINE WILL ATTACH THE 6 OR 7 S2K FILES
C
C      INPUT - IDBN  THE 18 CHARACTER DATA BASE NAME (A18)
C
C              IPACKF  =1  IF THE FILES TO BE ATTACHED ARE ON A
C                          PRIVATE PACK.
C                      =0  IF THE FILES TO BE ATTACHED ARE ON A
C                          SYSTEM PACK(ONLINE)
C
C              IPACKN      THIS IS THE 4 CHARACTER(A4) PACK NAME.
C                          THIS IS NEEDED IF IPACKF=1
C
C              IUSER       THIS IS THE 3 CHARACTER(A3) USER NUMBER THE
C                          DATA BASE WAS CREATED UNDER.
C
C*****************************************************************
C         NOTE        TO USE THIS ROUTINE YOU MUST HAVE DONE A
C                     C A L L   U S E R D B X (  2 H D B )
C                     IN THE MAIN PROGRAM AND ALSO
C                     G E T , A U X L I B / U N = L I B R A R Y .
C                     L D S E T , L I B = A U X L I B .
C                     WHICH LOADS THE PF ROUTINE
C*****************************************************************
C
      DIMENSION LETTERS(7),C(20),X(5),IRM(4)
      INTEGER C,X
      DATA LETTERS/2HTA,2HTB,2HTC,2HTD,2HTE,2HTF,2HTU/
      DATA (C(I),I=11,20)/10*(1R )/,IRM(4)/0/
C
C     COMPUTE THE 5 DIGIT HASH CODE FROM THE DATA BASE NAME
C
C     NOTE -  THE ALGORITHM ASSUMES A 20 CHARACTER DBN BUT
C             WE ONLY USE A MAXIMUM OF 18 CHARACTERS DUE TO
C             OTHER REQUIREMENTS. ARRAY C WORDS 11 TO 20
C             ARE BLANK FILLED IN THE DATA STATEMENT.
C
C     CONVERT THE DBN TO R FORMAT
C
      DECODE(18,100,IDBN)(C(I),I=1,18)
100   FORMAT(18R1)
C
C   COMPUTE THE HASH CODE
C
      DO 10 N=1,5
      X(N)=C(N)+C(N+5)+C(N+10)+C(N+15)
      X(N)=X(N).AND.37B
      IF(X(N).EQ.0)X(N)=6-N
10    CONTINUE
C
C     CONVERT FROM R FORMAT TO A FORMAT
C
      ENCODE(5,200,IHASH)X
200   FORMAT(5R1)
C
C  COMBINE THE 2 CHARACTER FILE IDENTIFIER WITH THE HASH CODE
C
      DO 11 I=1,7
      ENCODE(7,20,IFILENM)LETTERS(I),IHASH
20    FORMAT(A2,A5)
C
C     THESE CALLS DEFAULT TO THE NA OPTION
C
C
C     IF THE DATA BASE IS ON A PRIVATE PACK WE HAVE TO
C           INCLUDE THIS INFORMATION IN THE CALL
C
       IF(IPACKF.NE.0)CALL PF("ATTACH",IFILENM,IFILENM,"RC",
     1 ICODE,"PN",IPACKN,"UN",IUSER)
       IF(IPACKF.EQ.0)CALL PF("ATTACH",IFILENM,IFILENM,"RC",
     1 ICODE,"UN",IUSER)
C
C     TRAP THE ERROR CODE BUT WE      W FOR THE UPDATE LOG (FILE 7)
C          (FILE TU.....) NOT T       PRESENT
C
      IF(ICODE.EQ.2.AND.I.EQ       TO 11
```

```
                      IF(ICODE.NE.0)PRINT 400,IFILENM,ICODE,IPACKF,IPACKN,
                     1   IUSER
      00        400   FORMAT(*0 ERROR IN CALL PF  *,A7,2X,O4,2X,I1,2X,
                     1   A4,4X,A3)
                C
                C    ABORT THE JOB
                C
      05             IF(ICODE.NE.0)CALL SYSTEM(52,' RUN ABORTED ')
                11   CONTINUE
                     ENCODE(30,510,IRM)IDBN
                510  FORMAT(*DB *,A10,* WAS ATTACHED    *)
                C
      90        C    WRITE A MESSAGE INTO THE DAYFILE
                C
                     CALL REMARK(IRM)
                     RETURN
                     END
```

CARD NR. SEVERITY DETAILS DIAGNOSIS OF PROBLEM

71 I) ARGUMENT COUNT INCONSISTENT WITH PRIOR USAGE.

SYMBOLIC REFERENCE MAP (R:1)

ENTRY POINTS
3 ATTS2K

VARIABLES	SN	TYPE	RELOCATION					
212 C		INTEGER	ARRAY	176	I	INTEGER		
202 ICODE		INTEGER		0	IDBN	INTEGER		F.P.
201 IFILENM		INTEGER		200	IHASH	INTEGER		
0 IPACKF		INTEGER	F.P.	0	IPACKN	INTEGER		F.P.
243 IRM		INTEGER	ARRAY	0	IUSER	INTEGER		F.P.
203 LETTERS		INTEGER	ARRAY	177	N	INTEGER		
236 X		INTEGER	ARRAY					

FILE NAMES	MODE
OUTPUT	FMT

EXTERNALS	TYPE	ARGS			
PF		9	REMARK	1	
SYSTEM		2			

STATEMENT LABELS

0	10		55	11		137	20	FMT		
120	100	FMT	127	200	FMT	151	400	FMT		
164	510	FMT								

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
13	10	N	46 58	7B	OPT
26	11	I	59 86	32B	EXT REFS

STATISTICS
PROGRAM LENGTH 2768 198
520008 CM USED

Annexe E
Guide de l'utilisateur

THIS USER GUIDE IS SPECIFIC TO THE CYBER CDC 171 AND NOS. IT IS INCLUDED, HOWEVER, TO DEMONSTRATE THE INFORMATION REQUIRED TO RUN THE PROGRAM. "SPROCS", REFERRED TO IN LINE 4 OF THE PROGRAM, IS THE PROCEDURE FILE FOR ALDAR, USED TO ATTACH THE DATABASE , LIBRARY CODES, ETC.

```
PROGRAM ALDAR
*************

PURPOSE - TO CALCULATE VOLUME WEIGHTED AVERAGES FOR LAKE DATA BY
          ARBITRARY REGIONS (ZONES).

RUN INSTRUCTIONS -

ALDAR.
USER(NNN,MMM)      NNN-USER NUMBER,MMM-PASSWORD
CHARGE,XXX,YYY.    XXX-CHARGE CODE,YYY-STUDY NUMBER
GET,SPROCS/UN=882.
BEGIN,ALDAR,SPROCS,INFIL=FILENAME,REPS=YN.
            NOTE - FILENAME IS THE NAME OF THE ZONED BATHYMETRY FILE
                   COL 1 -4 "ZBAT"
                          5 A NUMBER GIVING THE SIZE OF THE GRID IN KM.
                          6 "K"
                          7 AN LETTER GIVING THE LAKE
                            O LAKE ONTARIO
                            E LAKE ERIE
                            S LAKE SUPERIOR
                            G GEORGIAN BAY
                            H LAKE HURON
                         I.E. ZBAT2KO IS THE FILE NAME FOR A ZONED 2
                                      KM. GRID FOR LAKE ONTARIO.
            NOTE - WHEN YN IS YES (DEFAULT) THE SUMMARY REPORT IS
                                 ADDED TO FILE ALDREPS.
                   WHEN YN IS NO THE SUMMARY REPORT IS NOT ADDED.
7-8-9
CARD 1    COL  1-10 DATA BASE PASSWORD (LEFT JUSTIFIED)
              11-20 DATA BASE NAME (LEFT JUSTIFIED)
                 21 =1 IF THE FILES TO BE ATTACHED ARE ON A
                       PRIVATE PACK.
                    =0 IF THE FILES TO BE ATTACHED ARE ON A
                       SYSTEM PACK (ONLINE).
              22-25 THIS IS THE 4 CHARACTER(A4) PACK NAME.
                    THIS IS NEEDED IF COLUMN 21 IS 1.

              27-29 THIS IS THE 3 CHARACTER(A3) USER NUMBER
                    THE DATA BASE WAS CREATED UNDER.
                    REFER TO DATA BASE NAMES TABLES.
CARD 2    COL  1- 3 NO. OF PARAMETER CODES TO BE READ (MAXIMUM OF 50)
                    (RIGHT JUSTIFIED)
                 9 =1 IF ACTUAL OBSERVATIONS IN EACH ZONE ARE LISTED.
                    =0 THEY ARE NOT LISTED
CARD 3              GIVES THE ZONE NUMBER OF THOSE ZONES IN THE LAKE THAT
                  ARE NOT TO BE INCLUDED IN THE CALCULATIONS
            COL 1-2 NUMBER OF ZONES TO BE EXCLUDED (RIGHT JUSTIFIED)
                3-5 1ST ZONE NUMBER
                6-8 2ND ZONE NUMBER
                ...
                ETC. 20TH ZONE NUMBER
```

```
              NOTE - THIS CARD IS LEFT BLANK IF ALL THE ZONES ARE BEING
                     EXAMINED.
CARDS 4,5,6    THESE CARDS SPECIFY THE STANDARD DEPTHS TO WHICH
               PARAMETERS VALUES ARE TO BE INTERPOLATED, A MAXIMUM
               OF 20 STANDARD DEPTHS IS ALLOWED.(8 PER CARD)
          COL  1-10 1ST DEPTH (F5.0)
               11-20 2ND DEPTH
               ...
               ...
                     20TH DEPTH (CARD 6)
               NOTE - ALL 3 DEPTH CARDS MUST BE SUBMITTED EVEN IF LESS
                      THAN 20 DEPTHS ARE DESIRED,THE REMAINING
                      DEPTH FIELDS ARE LEFT BLANK.
CARD 7    COL 1-7  THIS CARD SPECIFIES THE CRUISE NUMBER WANTED.
                   I.E 7822003
CARD 8 (9,10) PARAMETER CODE CARD
          COL  2- 4 FIRST PARAMETER CODE
               6- 8 2ND PARAMTER CODE
              10-12 3RD PARAMETER CODE
              ...
              ...
              ETC.  SPECIFY THE PARAMETER CODES FOR THE NO. OF
                    PARAMETERS TO BE READ (GIVEN ON CARD 2).  USE
                    1, 2, OR 3 CARDS WITH 20 CODES PER CARD.
                      IF EBT VALUES ARE WANTED, ONLY ONE CODE MUST BE
                    SPECIFIED, AND IT MUST BE A TEMPERATURE CODE (100
                    OR 104).  THIS TEMPERATURE CODE WILL ONLY BE USED
                    FOR STATIONS WHERE EBTS ARE NOT AVAILABLE.
                      IF CODE 104 IS SELECTED FOR A CRUISE BEFORE 1972,
                    IT IS CHANGED TO CODE 100, SINCE 104 IS NOT AVAILABLE.
CARD 11         THE NEXT 2 CARDS GIVE THE DEPTH NUMBERS FOR 2 ZONES
                IN THE SUMMARY REPORT OF AREA WEIGHTED MEAN VALUES.
            COL 3- 4 ZONE NUMBER FOR WHICH SEVERAL DEPTHS ARE SPECIFIED
                7- 8 1ST DEPTH NUMBER (1-20)
               11-12 2ND DEPTH NUMBER
               15-16 3RD DEPTH NUMBER
               ...
               ETC. UP TO 5 DEPTH NUMBERS CORRESPONDING TO THE STANDARD
                    DEPTHS GIVEN IN CARDS 4 TO 6.  FOR THE BOTTOM DEPTH,
                    GIVE THE LAST DEPTH NUMBER.
CARD 12         SAME FORMAT AS CARD 11.
                THE ZONE NUMBER MUST BE 25 (ENTIRE LAKE)
6-7-8-9
```

Annexe F
Spécimen de sortie

REMARQUE : Seule la première page et la sortie pour le code 104 (température) sont présentées.

ALDAR

NUMBER OF PARAMETER CODES = 4

ACTUAL OBSERVATIONS IN EACH ZONE WILL BE PRINTED

THE FOLLOWING 1 ZONES ARE EXCLUDED: 8

13 STANDARD DEPTHS:

0.00 1.00 5.00 10.00 20.00 40.00 90.00 140.00
150.00 175.00 200.00 210.00 225.00

CRUISE 7022003

PARAMETER CODES: 30 100 104 276

DEPTH NUMBERS FOR ZONE 17 IN SUMMARY REPORT ARE 5 6 13

DEPTH NUMBERS FOR ZONE 25 IN SUMMARY REPORT ARE 5 6 13

LAKE ONTARIO(2KM.) IS BEING STUDIED

PARAMETER T EB (104)

STANDARD DEPTHS:

PSN	0.	1.	5.	10.	20.	40.	90.	140.	150.	175.	200.	210.	225.
001	1.90	1.90	1.90	1.90	2.09								
003	1.83	1.83	1.82	1.81	1.80								
002	1.78	1.78	1.78	1.78	1.78	1.88							
005	2.00	2.00	2.00	2.00	2.09								
006	1.70	1.70	1.70	1.70	1.70	1.80							
014	1.70	1.70	1.70	1.70	1.70	1.76	1.90						
013	1.50	1.50	1.50	1.50	1.50	1.50	1.85						
012	1.40	1.40	1.40	1.40	1.40	1.56	2.00						
007	1.80	1.80	1.80	1.80	1.80	1.80							
008	2.10	2.10	2.10	2.10									
009	1.80	1.80	1.80	1.80	1.80	1.60							
011	1.40	1.40	1.40	1.40	1.40	1.55							
010	2.00	2.00	2.00	2.00									
005	1.60	1.60	1.60	1.60	1.61	1.85							
027	1.20	1.20	1.21	1.22	1.25	1.30	1.93						
028	1.60	1.60	1.60	1.60	1.60	1.60							
029	2.20	2.20	2.20	2.20	2.20								
030	1.90	1.90	1.90	1.90	1.90	1.90							
032	1.50	1.50	1.50	1.50	1.50	1.53							
031	2.30	2.30	2.30	2.30									
091	2.20	2.20	2.20	2.20									
043	2.40	2.40	2.40	2.40									
042	1.50	1.50	1.50	1.50	1.50	1.54							
041	1.10	1.10	1.10	1.10	1.10	1.16	1.37						
044	1.70	1.70	1.70	1.70	1.70	1.70							
045	1.20	1.20	1.20	1.20	1.27	1.39							
046	1.70	1.70	1.70	1.70	1.70	1.85							
047	2.40	2.40	2.44	2.50									
048	1.33	1.33	1.33	1.33	1.33								
049	1.40	1.40	1.40	1.40	1.41	1.42							
061	1.20	1.20	1.20	1.20	1.27	1.63							
063	.80	.80	.79	.78	.77	.82							
062	1.40	1.40	1.40										
004	1.10	1.10	1.10	1.10	1.83								
001	.92	.92	.92	.91	.93								
003	.80	.80	.80	.80	.80								
002	1.10	1.10	1.07	1.04	1.03								
000	.60	.60	.60	.60	.60								
079	.40	.40	.40	.40									
078	.40	.40	.40	.40	.40								
077	.40	.40	.40	.40	.40								
090	.30	.30	.30	.30									
075	.30	.30	.26	.20	.27								
074	1.20	1.20	1.16	1.10	1.10	1.10							
009	1.30	1.30	1.30	1.30	1.29	1.39							
073	1.60	1.60	1.56	1.50	1.50								
098	1.25	1.25	1.26	1.20	1.26	1.42							
072	1.20	1.20	1.20	1.20	1.20	1.25	1.44						
071	2.30	2.30	2.20	2.25									
070	1.10	1.10	1.10	1.10	1.10	1.10	1.10	2.22	2.46				
069	.80	.80	.80	.79	.79	.78	.92	2.31	2.59				
068	1.00	1.00	1.00	1.00	.99	.99	.97	2.23	2.58	2.78			
067	1.30	1.30	1.29	1.28	1.27	1.38							
066	2.00	2.00	2.00	2.00									
095	1.52	1.52	1.52	1.52	1.53	1.67							
065	1.19	1.19	1.19	1.20	1.20	1.21	1.25	2.29	2.39				
064	.90	.90	.91	.91	.93	.96	1.04	1.98	2.32	2.69	2.81	2.86	
060	1.00	1.00	1.00	1.00	1.00	1.00	1.13	2.22	2.44				
094	1.50	1.50	1.50	1.50	1.50	1.56							
059	1.10	1.10	1.10	1.10	1.10	1.10	1.10	2.82	2.84	2.90			
055	1.10	1.10	1.10	1.10	1.10	1.10	1.10	2.53	2.80	2.80			
058	1.30	1.30	1.30	1.30	1.30	1.30							
056	1.25	1.25	1.25	1.25	1.25	1.25	1.25						
054	1.20	1.20	1.20	1.20	1.20	1.20	1.20	3.00					
087	1.50	1.50	1.50	1.50	1.50								
057	2.20	2.20	2.20	2.20									
053	1.80	1.80	1.80	1.80	1.94								
052	1.20	1.20	1.20	1.20	1.27	1.27	1.38						

PARAMETER T EB (184)

038	1.90	1.90	1.90	1.90						
039	1.30	1.30	1.30	1.30	1.30	1.30	1.30	2.78		
040	1.30	1.30	1.30	1.30	1.30	1.31	1.32	3.03	3.04	3.07
036	1.30	1.30	1.30	1.30	1.30	1.30	1.30	2.73	2.80	
037	1.85	1.85	1.83	1.80	1.80					
035	1.25	1.25	1.24	1.22	1.22					
034	1.52	1.52	1.52	1.52	1.52	1.52	1.53			
033	1.35	1.35	1.35	1.35	1.35	1.35	1.35			
026	1.30	1.30	1.30	1.30	1.30	1.30	1.74			
025	1.60	1.60	1.60	1.60	1.60	1.60	2.34			
024	1.50	1.50	1.50	1.50	1.50	1.50	2.35			
023	1.40	1.40	1.40	1.40	1.40	1.40	1.77			

093	1.28	1.28	1.28	1.28			
022	.97	.97	.97	.97			
021	2.30	2.30	2.34	2.40			
006	3.40	3.40	3.43	3.46			
020	1.50	1.50	1.50	1.50	1.50	1.52	
019	1.40	1.40	1.40	1.40	1.40	1.40	1.74
018	1.67	1.67	1.67	1.67	1.69	1.72	
017	2.65	2.65	2.72	2.80			
016	1.70	1.70	1.70	1.70	1.71	1.71	
092	2.33	2.33	2.35	2.37	2.47		
015	1.53	1.53	1.53	1.53	1.56	1.62	

CRUISE 7822803 ZONE NUMBER 1

PARAMETER T EB(104)

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	VOLUME WEIGHTED VALUES COLUMN
0.00	.6727	278		0.		0.		
			.187E+03		.278E+03		.6727	.6727
1.00	.6727	270		.1870E+03		.2780E+03	.6711	
			.721E+03		.187E+04			.6714
5.00	.6695	259		.9077E+03		.1352E+04	.6539	
			.827E+03		.127E+04			.6629
10.00	.6381	247		.1735E+04		.2617E+04	.6742	
			.142E+04		.211E+04			.6680
20.00	.7140	174		.3154E+04		.4722E+04		
40.00		7						

THERE ARE 33 OBSERVATIONS AFFECTING CALCULATIONS IN ZONE 1

VALUES WITH A * ARE ACTUAL OBSERVATIONS IN THE ZONE

PERMANENT STATION NO.	862	862	884	884	884	884	881*	881*	881*	881*	883*	883*	883*
VALUE	1.4000	1.4000	1.1000	1.1000	1.0000	1.0000	.9200	.9100	.9400	1.0200	.0000	.0000	.0000
DEPTH	1.0	9.5	1.0	10.0	25.0	36.0	1.0	10.0	25.0	34.0	1.0	10.0	25.0
PERMANENT STATION NO.	883*	882*	882*	882*	888*	888*	888*	879*	879*	879*	878*	878*	878*
VALUE	.0000	1.1000	1.0400	1.0200	.6000	.6000	.6000	.4000	.4000	.4000	.4000	.4000	.4000
DEPTH	30.0	1.0	10.0	25.0	1.0	10.0	20.0	1.0	10.0	18.5	1.0	10.0	24.0
PERMANENT STATION NO.	877*	877*	877*	877*	898*	898*	893*						
VALUE	.4000	.4000	.4000	.4000	.3000	.3000	.3000						
DEPTH	1.0	10.0	25.0	20.0	1.0	10.0	17.0						

CRUISE 7822803 ZONE NUMBER 2

PARAMETER T EB(104)

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	VOLUME WEIGHTED VALUES COLUMN
0.00	1.2430	73		0.		0.		
			.908E+02		.738E+02		1.2430	1.2430
1.00	1.2430	73		.9080E+02		.7380E+02	1.2435	
			.346E+03		.278E+03			1.2436
5.00	1.2431	66		.4365E+03		.3510E+03	1.1307	
			.347E+03		.305E+03			1.1948
10.00	1.0284	56		.7638E+03		.6560E+03	1.0319	
			.508E+03		.485E+03			1.1255
20.00	1.0357	41		.1284E+04		.1141E+04	1.1747	
			.681E+03		.580E+03			1.1421
40.00	1.3582	17		.1966E+04		.1721E+04		

THERE ARE 18 OBSERVATIONS AFFECTING CALCULATIONS IN ZONE 2

VALUES WITH A * ARE ACTUAL OBSERVATIONS IN THE ZONE

PERMANENT STATION NO.	861	861	861	861	863	863	863	863	862*	862*	884	884	884
VALUE	1.2000	1.2000	1.3000	1.6700	.0000	.7000	.7700	.9700	1.4000	1.4000	1.1000	1.1000	1.0000
DEPTH	1.0	10.0	25.0	42.0	1.0	10.0	25.0	83.0	1.0	9.5	1.0	10.0	25.0

PERMANENT STATION NO.	884	883	883	883	883
VALUE	1.0000	.0000	.0000	.0000	.0000
DEPTH	35.0	1.0	10.0	25.0	35.0

CRUISE 7822883 ZONE NUMBER 3

PARAMETER T EB(184)

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	VOLUME WEIGHTED VALUES COLUMN
0.00	1.4073	120		0.		0.		
			.198E+03		.120E+03		1.4073	
1.00	1.4073	120		.1984E+03		.1208E+03		1.4073
			.736E+03		.494E+03		1.4900	
5.00	1.4943	119		.9268E+03		.6228E+03		1.4901
			.865E+03		.578E+03		1.4906	
10.00	1.5030	112		.1792E+04		.1200E+04		1.4942
			.148E+04		.985E+03		1.4257	
20.00	1.3418	85		.3197E+04		.2185E+04		1.4533
			.153E+04		.108E+04		1.4203	
40.00	1.5371	23		.4731E+04		.3265E+04		1.4491

THERE ARE 18 OBSERVATIONS AFFECTING CALCULATIONS IN ZONE 3

VALUES WITH A * ARE ACTUAL OBSERVATIONS IN THE ZONE

PERMANENT STATION NO.	846	846	846	846	847*	847*	847*	848*	848*	848*	849	849	849
VALUE	1.7000	1.7000	1.7000	1.9000	2.4000	2.5000	2.7500	1.3300	1.3300	1.3300	1.4000	1.4000	1.4200
DEPTH	1.0	10.0	25.0	45.0	1.0	10.0	14.5	1.0	10.0	20.0	1.0	10.0	25.0

PERMANENT STATION NO.	849	861	861	861	861
VALUE	1.4200	1.2000	1.2000	1.3000	1.6700
DEPTH	40.0	1.0	10.0	25.0	42.0

CRUISE 7822883 ZONE NUMBER 4

PARAMETER T EB(184)

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	VOLUME WEIGHTED VALUES COLUMN
0.00	1.9583	187		0.		0.		
			.366E+03		.187E+03		1.9583	
1.00	1.9583	187		.3662E+03		.1878E+03		1.9583
			.143E+04		.732E+03		1.9590	
5.00	1.9614	179		.1881E+04		.9198E+03		1.9595
			.171E+04		.878E+03		1.9633	
10.00	1.9652	169		.3589E+04		.1789E+04		1.9613
			.279E+04		.154E+04		1.8182	
20.00	1.6547	138		.6295E+04		.3324E+04		1.8938
			.362E+04		.213E+04		1.7818	
40.00	1.7574	75		.9918E+04		.5454E+04		1.8185

THERE ARE 28 OBSERVATIONS AFFECTING CALCULATIONS IN ZONE 4

VALUES WITH A * ARE ACTUAL OBSERVATIONS IN THE ZONE

PERMANENT STATION NO.	831	831	831	891*	891*	891*	843*	843*	843*	842	842	842	842
VALUE	2.3000	2.3000	2.3000	2.2000	2.2000	2.2000	2.4000	2.4000	2.4000	1.5000	1.5000	1.5000	1.6000
DEPTH	1.0	10.0	10.0	1.0	10.0	16.5	1.0	10.0	19.0	1.0	10.0	25.0	63.0
PERMANENT STATION NO.	844*	844*	844*	844*	845	845	845	845	846*	846*	846*	846*	847
VALUE	1.7000	1.7000	1.7000	1.8000	1.2000	1.2000	1.3000	1.6000	1.7000	1.7000	1.7000	1.9000	2.4000
DEPTH	1.0	10.0	25.0	44.5	1.0	10.0	25.0	76.0	1.0	10.0	25.0	45.0	1.0
PERMANENT STATION NO.	847	847											
VALUE	2.3000	2.7500											
DEPTH	10.0	14.5											

CRUISE 7802003 ZONE NUMBER 5

PARAMETER T EB(184)

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	VOLUME WEIGHTED VALUES COLUMN
0.00	1.8253	178		0.		0.		
			.325E+03		.178E+03		1.8253	
1.00	1.8253	178		.3249E+03		.1788E+03		1.8253
			.127E+04		.698E+03		1.8256	
5.00	1.8268	171		.1599E+04		.8768E+03		1.8256
			.152E+04		.838E+03		1.8264	
10.00	1.8269	161		.3115E+04		.1706E+04		1.8268
			.267E+04		.158E+04		1.7060	
20.00	1.7429	138		.5785E+04		.3281E+04		1.8873
			.408E+04		.229E+04		1.7448	
40.00	1.7471	91		.9781E+04		.5491E+04		1.7812
			.469E+04		.268E+04		1.8847	
90.00	1.9000	13		.1447E+05		.8091E+04		1.7000

THERE ARE 33 OBSERVATIONS AFFECTING CALCULATIONS IN ZONE 5

VALUES WITH A * ARE ACTUAL OBSERVATIONS IN THE ZONE

PERMANENT STATION NO.	818	818	818	885*	885*	885*	885*	827*	827*	827*	827*	828*	828*
VALUE	2.0000	2.0000	2.0000	1.6000	1.6000	1.6200	1.8900	1.2000	1.4000	2.3000	2.3000	1.6000	1.6000
DEPTH	1.0	10.0	13.0	1.0	10.0	25.0	43.0	1.0	83.0	95.0	97.0	1.0	10.0
PERMANENT STATION NO.	828*	828*	829*	829*	829*	938*	838*	838*	838*	832	832	832	832
VALUE	1.6000	1.6300	2.2000	2.2000	2.2000	1.9000	1.9000	1.9000	1.9000	1.5000	1.5000	1.5000	1.6000
DEPTH	25.0	50.5	1.0	10.0	20.0	1.0	10.0	25.0	40.0	1.0	10.0	25.0	73.0
PERMANENT STATION NO.	831*	831*	831*	826	826	826	826						
VALUE	2.3000	2.3000	2.3000	1.3000	1.3000	2.6300	2.6300						
DEPTH	1.0	10.0	10.0	1.0	60.0	110.0	119.0						

CRUISE 7802003 ZONE NUMBER 6

PARAMETER T EB(184)

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	VOLUME WEIGHTED VALUES COLUMN
0.00	1.7494	85		0.		0.		
			.149E+03		.858E+02		1.7494	
1.00	1.7494	85		.1487E+03		.8508E+02		1.7494

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	VOLUME WEIGHTED VALUES COLUMN
5.00	1.7494	78	.570E+03	.7190E+03	.326E+03	.4118E+03	1.7494	1.7494
10.00	1.7494	71	.652E+03	.1371E+04	.373E+03	.7835E+03	1.7494	1.7494
20.00	1.6419	62	.113E+04	.2499E+04	.665E+03	.1449E+04	1.6969	1.7253
40.00	1.6686	48	.182E+04	.4315E+04	.118E+04	.2549E+04	1.6589	1.6932
90.00	2.0753	18	.264E+04	.6958E+04	.145E+04	.3999E+04	1.8227	1.7481

THERE ARE 26 OBSERVATIONS AFFECTING CALCULATIONS IN ZONE 6

VALUES WITH A * ARE ACTUAL OBSERVATIONS IN THE ZONE

PERMANENT STATION NO.	006	006	006	006	012	012	012	012	007*	007*	007*	007*	008*
VALUE	1.7000	1.7000	1.7000	1.9000	1.4000	1.4000	1.4000	2.2000	1.8000	1.8000	1.8000	1.8000	2.1000
DEPTH	1.0	10.0	25.0	67.0	1.0	10.0	25.0	102.0	1.0	10.0	25.0	44.0	1.0
PERMANENT STATION NO.	008*	008*	009*	009*	009*	009*	011*	011*	011*	011*	010*	010*	010*
VALUE	2.1000	2.1000	1.8000	1.8000	1.9000	1.4000	1.4000	1.4000	1.4000	1.9000	2.0000	2.0000	2.0000
DEPTH	10.0	13.5	1.0	10.0	25.0	55.0	1.0	10.0	25.0	85.0	1.0	10.0	13.0

CRUISE 7822003 ZONE NUMBER 7

PARAMETER T EB(104)

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	VOLUME WEIGHTED VALUES COLUMN
0.00	1.9478	138		0.		0.		
1.00	1.9478	138	.269E+03	.2687E+03	.138E+03	.1388E+03	1.9478	1.9478
5.00	1.9488	124	.182E+04	.1209E+04	.524E+03	.6628E+03	1.9479	1.9477
10.00	1.9511	111	.115E+04	.2435E+04	.588E+03	.1250E+04	1.9499	1.9488
20.00	2.0087	85	.154E+04	.4374E+04	.988E+03	.2238E+04	1.9786	1.9619
40.00	1.8414	47	.255E+04	.6926E+04	.132E+04	.3558E+04	1.9331	1.9512

THERE ARE 29 OBSERVATIONS AFFECTING CALCULATIONS IN ZONE 7

VALUES WITH A * ARE ACTUAL OBSERVATIONS IN THE ZONE

PERMANENT STATION NO.	001*	001*	001*	003*	003*	003*	002*	002*	002*	002*	005*	005*	005*
VALUE	1.9000	1.9000	2.2000	1.8300	1.8100	1.8000	1.7000	1.7000	1.7000	2.0000	2.0000	2.0000	2.1300
DEPTH	1.0	10.0	26.0	1.0	10.0	28.5	1.0	10.0	25.0	50.0	1.0	10.0	25.0
PERMANENT STATION NO.	005*	006*	006*	006*	006*	007	007	007	007	016	016	016	016
VALUE	2.4000	1.7000	1.7000	1.7000	1.9000	1.8000	1.8000	1.8000	1.8000	1.7000	1.7000	1.7200	1.7000
DEPTH	27.0	1.0	10.0	25.0	67.0	1.0	10.0	25.0	44.0	1.0	10.0	25.0	62.0
PERMANENT STATION NO.	096*	096*	096*										
VALUE	2.3300	2.3700	2.4700										
DEPTH	1.0	10.0	20.0										

ZONE 8 HAS BEEN ELIMINATED

CRUISE 7822003 ZONE NUMBER 9

PARAMETER T EB(184)

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	COLUMN
0.00	1.8238	133		0.		0.	1.8238	
1.00	1.8238	133	.242E+03	.2425E+03	.133E+03	.1330E+03		1.8238
5.00	1.8393	126	.948E+03	.1191E+04	.518E+03	.6510E+03	1.8311	1.8294
10.00	1.8596	115	.111E+04	.2305E+04	.603E+03	.1254E+04	1.8493	1.8398
20.00	1.6155	85	.174E+04	.4049E+04	.100E+04	.2254E+04	1.7436	1.7967
40.00	1.6381	66	.246E+04	.6585E+04	.151E+04	.3764E+04	1.6263	1.7203
90.00	1.7662	14	.33RE+04	.9861E+04	.200E+04	.5764E+04	1.6883	1.7144

THERE ARE 36 OBSERVATIONS AFFECTING CALCULATIONS IN ZONE 9

VALUES WITH A * ARE ACTUAL OBSERVATIONS IN THE ZONE

PERMANENT STATION NO.	835	835	835	823*	823*	823*	823*	893*	893*	893*	822*	822*	822*
VALUE	1.2500	1.2200	1.2200	1.4000	1.4000	1.4000	1.0000	1.2000	1.2000	1.2000	.9700	.9700	.9700
DEPTH	1.0	10.0	24.5	1.0	10.0	25.0	96.0	1.0	10.0	10.0	1.0	10.0	13.0
PERMANENT STATION NO.	821*	821*	821*	806*	806*	828*	828*	828*	828*	818*	818*	818*	818*
VALUE	2.3000	2.4000	2.4000	3.4000	3.4700	1.5000	1.5000	1.5000	1.6000	1.6700	1.6700	1.7000	1.7000
DEPTH	1.0	10.0	14.0	1.0	11.0	1.0	10.0	25.0	80.0	1.0	10.0	25.0	85.0
PERMANENT STATION NO.	817*	817*	817*	816*	816*	816*	816*	896	896	896			
VALUE	2.6500	2.8000	3.3000	1.7000	1.7000	1.7200	1.7000	2.3300	2.3700	2.4700			
DEPTH	1.0	13.0	14.0	1.0	10.0	25.0	62.0	1.0	10.0	20.0			

CRUISE 7822003 ZONE NUMBER 10

PARAMETER T EB(184)

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	COLUMN
0.00	1.4686	501		0.		0.	1.4686	
1.00	1.4686	501	.736E+03	.7357E+03	.501E+03	.5018E+03		1.4686
5.00	1.4691	501	.294E+04	.3679E+04	.200E+04	.2505E+04	1.4688	1.4688
10.00	1.4697	501	.368E+04	.7360E+04	.251E+04	.5018E+04	1.4694	1.4691
20.00	1.4743	501	.738E+04	.1474E+05	.501E+04	.1002E+05	1.4721	1.4706
40.00	1.5007	501	.149E+05	.2968E+05	.100E+05	.2004E+05	1.4916	1.4811
90.00	1.8984	435	.398E+05	.6944E+05	.234E+05	.4344E+05	1.6998	1.5985

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	VOLUME WEIGHTED VALUES COLUMN
140.00		27						

THERE ARE 93 OBSERVATIONS AFFECTING CALCULATIONS IN ZONE 10

VALUES WITH A * ARE ACTUAL OBSERVATIONS IN THE ZONE

PERMANENT STATION NO.	003	003	003	002	002	002	002	006	006	006	006	014*	014*
VALUE	1.6300	1.6100	1.6000	1.7000	1.7000	1.7000	2.0000	1.7000	1.7000	1.7000	1.9000	1.7000	1.7000
DEPTH	1.0	10.0	20.5	1.0	10.0	25.0	56.0	1.0	10.0	25.0	67.0	1.0	10.0
PERMANENT STATION NO.	014*	014*	013*	013*	013*	013*	012*	012*	012*	012*	011	011	011
VALUE	1.7000	2.0000	1.5000	1.5000	1.5300	1.9000	1.4000	1.4000	1.4000	2.2000	1.4000	1.4000	1.4000
DEPTH	25.0	95.5	1.0	10.0	25.0	99.0	1.0	10.0	25.0	102.0	1.0	10.0	25.0
PERMANENT STATION NO.	011	010	010	010	005	005	005	005	027	027	027	027	028
VALUE	1.3000	2.0000	2.0000	2.0000	1.6000	1.6000	1.6200	1.8900	1.2000	1.4000	2.3000	2.3[illegible]	1.6000
DEPTH	85.0	1.0	10.0	13.0	1.0	10.0	25.0	43.0	1.0	83.0	95.0	97.0	1.0
PERMANENT STATION NO.	028	028	028	035	035	035	034	034	034	034	033*	033*	033*
VALUE	1.6000	1.6000	1.6000	1.2500	1.2200	1.2200	1.5200	1.5300	2.0000	2.0000	1.3500	1.3500	2.6000
DEPTH	10.0	25.0	50.5	1.0	10.0	24.5	1.0	90.0	105.0	132.0	1.0	93.0	130.0
PERMANENT STATION NO.	026*	026*	026*	026*	025*	025*	025*	025*	024*	024*	024*	024*	023
VALUE	1.3000	1.3000	2.6300	2.6300	1.6000	1.6000	2.0000	2.9000	1.5000	1.5000	2.9000	2.9000	1.4000
DEPTH	1.0	80.0	110.0	119.0	1.0	74.0	100.0	132.0	1.0	76.0	99.0	110.0	1.0
PERMANENT STATION NO.	023	023	023	093	093	093	021	021	021	020	020	020	020
VALUE	1.4000	1.4000	1.9000	1.2000	1.2000	1.2000	2.3000	2.4000	2.4000	1.5000	1.5000	1.5000	1.6000
DEPTH	10.0	25.0	96.0	1.0	10.0	10.0	1.0	10.0	14.0	1.0	10.0	25.0	80.0
PERMANENT STATION NO.	019*	019*	019*	018	018	018	018	016	016	016	016	015*	015*
VALUE	1.4000	1.4000	2.6300	1.6700	1.6700	1.7000	1.7000	1.7000	1.7000	1.7200	1.7000	1.5300	1.3300
DEPTH	1.0	85.0	103.0	1.0	10.0	25.0	85.0	1.0	10.0	25.0	62.0	1.0	10.0
PERMANENT STATION NO.	015*	015*											
VALUE	1.5000	1.7300											
DEPTH	25.0	85.0											

CRUISE 7822003 ZONE NUMBER 11

PARAMETER T EB(184)

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	VOLUME WEIGHTED VALUES COLUMN
0.00	1.6069	126		0.		0.		
			.213E+03		.126E+03		1.6069	
1.00	1.6069	126		.2125E+03		.1260E+03		1.6069
			.821E+03		.488E+03		1.6825	
5.00	1.6779	118		.1034E+04		.6148E+03		1.6834
			.966E+03		.578E+03		1.6723	
10.00	1.6667	113		.1999E+04		.1192E+04		1.6788
			.162E+04		.985E+03		1.6483	
20.00	1.6281	84		.3623E+04		.2177E+04		1.6646
40.00		61						

THERE ARE 15 OBSERVATIONS AFFECTING CALCULATION ZONE 11

VALUES WITH A * ARE ACTUAL OBSERVATIONS IN THE

PERMANENT STATION NO.	057	057	057	053*	053*	053*	038*	038*	038*	037*	037*	037*	035*
VALUE	2.2000	2.2000	2.7000	1.0000	1.0000	2.0000	1.9000	1.9000	1.9000	1.8500	1.8000	1.8000	1.2500
DEPTH	1.0	10.0	12.0	1.0	10.0	24.0	1.0	10.0	17.0	1.0	10.0	21.0	1.0

PERMANENT STATION NO.	035*	035*
VALUE	1.2200	1.2200
DEPTH	10.0	24.5

CRUISE 7022003 ZONE NUMBER 12

PARAMETER T EB(184)

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	VOLUME WEIGHTED VALUES COLUMN
0.00	1.6041	61		0.		0.		
			.970E+02		.610E+02		1.6041	
1.00	1.6041	61		.9705E+02		.6100E+02		1.6041
			.379E+03		.236E+03		1.6041	
5.00	1.6041	57		.4764E+03		.2970E+03		1.6041
			.441E+03		.275E+03		1.6041	
10.00	1.6041	53		.9175E+03		.5720E+03		1.6041
			.732E+03		.490E+03		1.4937	
20.00	1.3771	45		.1649E+04		.1062E+04		1.5532
			.950E+03		.710E+03		1.3379	
40.00	1.2911	26		.2599E+04		.1772E+04		1.4669
			.111E+04		.875E+03		1.2739	
90.00	1.2500	9		.3714E+04		.2647E+04		1.4031
140.00		1						

THERE ARE 18 OBSERVATIONS AFFECTING CALCULATIONS IN ZONE 12

VALUES WITH A * ARE ACTUAL OBSERVATIONS IN THE ZONE

PERMANENT STATION NO.	058*	058*	058*	058*	056	056	056	056	007*	007*	007*	007*	057*
VALUE	1.3000	1.3000	1.3000	1.3000	1.2500	1.2500	1.2500	1.2500	1.5000	1.5000	1.5000	1.5000	2.2003
DEPTH	1.0	10.0	25.0	89.0	1.0	10.0	25.0	90.0	1.0	10.0	25.0	35.0	1.0

PERMANENT STATION NO.	057*	057*	053	053	053
VALUE	2.2000	2.7000	1.0000	1.0000	2.0000
DEPTH	10.0	12.0	1.0	10.0	24.0

CRUISE 7022003 ZONE NUMBER 13

PARAMETER T EB(184)

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	VOLUME WEIGHTED VALUES COLUMN
0.00	1.4533	66		0.		0.		
			.959E+02		.660E+02		1.4533	
1.00	1.4533	66		.9592E+02		.6600E+02		1.4533
			.378E+03		.260E+03		1.4533	
5.00	1.4533	64		.4730E+03		.3260E+03		1.4533
			.461E+03		.318E+03		1.4533	
10.00	1.4533	63		.9352E+03		.6435E+03		1.4533
			.829E+03		.578E+03		1.4546	
20.00	1.4568	51		.1764E+04		.1214E+04		1.4539
			.132E+04		.888E+03		1.4963	
40.00	1.5411	37		.3881E+04		.2894E+04		1.4717
			.145E+04		.185E+04		1.3765	
90.00	1.1888	5		.4526E+04		.3144E+04		1.4399

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	VOLUME WEIGHTED VALUES COLUMN
140.00	2.8213	0	.289E+03	.4736E+04	.125E+03	.3269E+04	1.6730	1.4489

THERE ARE 16 OBSERVATIONS AFFECTING CALCULATIONS IN ZONE 13

VALUES WITH A * ARE ACTUAL OBSERVATIONS IN THE ZONE

PERMANENT STATION NO.	895*	895*	895*	895c	894*	894*	894*	894*	859	859	859	859	858
VALUE	1.5200	1.5200	1.5300	1.6000	1.5000	1.5000	1.5000	1.6000	1.1000	1.1000	2.0000	2.0000	1.3000
DEPTH	1.0	10.0	25.0	41.0	1.0	10.0	25.0	49.0	1.0	103.0	130.0	177.0	1.0

PERMANENT STATION NO.	858	858	858
VALUE	1.3000	1.3000	1.3000
DEPTH	10.0	25.0	89.0

CRUISE 78E2003 ZONE NUMBER 14

PARAMETER T EB(104)

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	VOLUME WEIGHTED VALUES COLUMN
0.00	1.5304	135		0.		0.		
1.00	1.5304	135	.208E+03	.2077E+03	.135E+03	.1358E+03	1.5304	1.5304
5.00	1.5325	132	.820E+03	.1028E+04	.534E+03	.6698E+03	1.5355	1.5361
10.00	1.5250	124	.978E+03	.2006E+04	.640E+03	.1389E+04	1.5288	1.5325
20.00	1.2319	104	.150E+04	.3502E+04	.114E+04	.2449E+04	1.3827	1.4628
40.00	1.3074	79	.232E+04	.5903E+04	.103E+04	.4279E+04	1.2679	1.3795
90.00	1.2216	37	.368E+04	.9585E+04	.298E+04	.7179E+04	1.2697	1.3351
140.00	2.2401	12	.281E+04	.1160E+05	.123E+04	.8404E+04	1.6442	1.3802
150.00	2.4770	0	.235E+03	.1183E+05	.108E+03	.8504E+04	2.3510	1.3916
175.00	2.7770	1	.291E+03	.1213E+05	.113E+03	.8617E+04	2.5089	1.4072

THERE ARE 34 OBSERVATIONS AFFECTING CALCULATIONS IN ZONE 14

VALUES WITH A * ARE ACTUAL OBSERVATIONS IN THE ZONE

PERMANENT STATION NO.	888	888	888	888	872*	872*	872*	872*	871*	871*	871*	870	870
VALUE	1.2500	1.2000	1.2500	1.0000	1.2000	1.2000	1.2000	1.5000	2.3000	2.2500	2.2500	1.1000	1.1000
DEPTH	1.0	10.0	25.0	74.0	1.0	10.0	25.0	107.0	1.0	10.0	12.0	1.0	94.0
PERMANENT STATION NO.	870	870	868	868	868	868	867*	867*	867*	867*	866*	866*	866*
VALUE	2.7000	2.7000	1.0000	.9700	2.7200	2.8300	1.3000	1.2000	1.2600	1.6700	2.0000	2.0000	2.0000
DEPTH	160.0	167.0	1.0	104.0	154.0	194.0	1.0	10.0	25.0	78.0	1.0	10.0	17.0
PERMANENT STATION NO.	895	895	895	895	865	865	865	865					
VALUE	1.5200	1.5200	1.5300	1.6000	1.1900	1.2500	2.0003	2.4000					
DEPTH	1.0	10.0	25.0	41.0	1.0	97.0	112.0	151.0					

CRUISE 7822003 ZONE NUMBER 15

PARAMETER T EB(104)

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	VOLUME WEIGHTED VALUES COLUMN
0.00				0.		0.		
	1.0076	198	.215E+03	.2153E+03	.190E+03	.1900E+03	1.0076	1.0076
1.00	1.0076	198	.824E+03	.1839E+04	.766E+03	.9640E+03	1.0755	1.0700
5.00	1.0630	185	.943E+03	.1902E+04	.900E+03	.1864E+04	1.0478	1.0634
10.00	1.0323	175	.169E+04	.3670E+04	.163E+04	.3489E+04	1.0303	1.0517
20.00	1.0447	150	.272E+04	.6393E+04	.227E+04	.5759E+04	1.1997	1.1100
40.00	1.3919	77						
90.00		15						

THERE ARE 23 OBSERVATIONS AFFECTING CALCULATIONS IN ZONE 15

VALUES WITH A * ARE ACTUAL OBSERVATIONS IN THE ZONE

PERMANENT STATION NO.	877	877	877	877	875*	875*	875*	874	874	874	874	889*	889*
VALUE	.4000	.4000	.4000	.4000	.3000	.2000	.3000	1.2000	1.1000	1.1000	1.1000	1.3000	1.3000
DEPTH	1.0	10.0	25.0	28.0	1.0	10.0	25.0	1.0	10.0	25.0	67.0	1.0	10.0
PERMANENT STATION NO.	889*	889*	873*	873*	873*	873*	888*	888*	888*	888*			
VALUE	1.2000	1.7000	1.6000	1.5000	1.5000	1.5000	1.2500	1.2000	1.2500	1.0000			
DEPTH	25.0	82.0	1.0	10.0	25.0	30.5	1.0	10.0	25.0	74.0			

CRUISE 7822003 ZONE NUMBER 16

PARAMETER T EB(104)

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	VOLUME WEIGHTED VALUES COLUMN
0.00				0.		0.		
	.3000	49	.147E+02	.1470E+02	.490E+02	.4900E+02	.3000	.3000
1.00	.3000	49	.479E+02	.6263E+02	.160E+03	.2090E+03	.2996	.2997
5.00	.2991	31	.418E+02	.1044E+03	.140E+03	.3490E+03	.2985	.2992
10.00	.2980	25	.456E+02	.1501E+03	.160E+03	.5090E+03	.2852	.2948
20.00	.2667	7						

THERE ARE 6 OBSERVATIONS AFFECTING CALCULATIONS IN ZONE 16

VALUES WITH A * ARE ACTUAL OBSERVATIONS IN THE ZONE

PERMANENT STATION NO.	898	898	898	875	875	875
VALUE	.3000	.3000	.3000	.3000	.2000	.3000
DEPTH	1.0	10.0	17.0	1.0	10.0	25.0

CRUISE 7822003 ZONE NUMBER 17

PARAMETER T EB(104)

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	VOLUME WEIGHTED VALUES COLUMN
0.00	1.2359	2285		0.		0.		

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	VOLUME WEIGHTED VALUES COLUMN
			.282E+04		.229E+04		1.2359	
1.00	1.2359	2285		.2824E+04		.2285E+04		1.2359
5.00	1.2338	2285	.113E+05	.1411E+05	.914E+04	.1143E+05	1.2349	1.2351
10.00	1.2309	2280	.141E+05	.2817E+05	.114E+05	.2284E+05	1.2323	1.2337
20.00	1.2198	2266	.278E+05	.5682E+05	.227E+05	.4557E+05	1.2249	1.2293
40.00	1.2549	2219	.555E+05	.1115E+06	.449E+05	.9042E+05	1.2369	1.2331
90.00	1.2328	1717	.122E+06	.2339E+06	.984E+05	.1088E+06	1.2448	1.2387
140.00	2.5354	1182	.129E+06	.3633E+06	.785E+05	.2593E+06	1.8363	1.4812
150.00	2.6688	942	.266E+05	.3899E+06	.102E+05	.2695E+06	2.6888	1.4466
175.00	2.8641	414	.467E+05	.4366E+06	.178E+05	.2865E+06	2.7533	1.5239
200.00	2.8188	136	.195E+05	.4561E+06	.688E+04	.2933E+06	2.8416	1.5548
210.00	2.8688	68	.289E+04	.4590E+06	.182E+04	.2944E+06	2.8322	1.5592
210.00	2.8688	68	0.	.4590E+06	0.	.2944E+06	I	1.5592
225.00		9						

THERE ARE 175 OBSERVATIONS AFFECTING CALCULATIONS IN ZONE 17

VALUES WITH A * ARE ACTUAL OBSERVATIONS IN THE ZONE

PERMANENT STATION NO.	028	028	028	028	030	030	030	030	032*	032*	032*	032*	031
VALUE	1.6000	1.6000	1.6000	1.6000	1.9000	1.9000	1.9000	1.9000	1.5000	1.5000	1.5000	1.6000	2.3000
DEPTH	1.0	10.0	25.0	50.5	1.0	10.0	25.0	40.0	1.0	10.0	25.0	73.0	1.0
PERMANENT STATION NO.	031	031	091	091	091	042*	042*	042*	042*	041*	041*	041*	041*
VALUE	2.3000	2.3000	2.2000	2.2000	2.2000	1.5000	1.5000	1.5000	1.6000	1.1000	1.1000	1.1000	1.5000
DEPTH	10.0	10.0	1.0	10.0	16.5	1.0	10.0	25.0	63.0	1.0	10.0	25.0	121.0
PERMANENT STATION NO.	044	044	044	044	045*	045*	045*	045*	046	046	046	046	048
VALUE	1.7000	1.7000	1.7000	1.8000	1.2000	1.2000	1.3000	1.6000	1.7000	1.7000	1.7000	1.9000	1.3300
DEPTH	1.0	10.0	25.0	44.5	1.0	10.0	25.0	76.0	1.0	10.0	25.0	45.0	1.0
PERMANENT STATION NO.	048	048	049*	049*	049*	049*	061*	061*	061*	061*	063*	063*	063*
VALUE	1.3300	1.3300	1.4000	1.4000	1.4200	1.4200	1.2000	1.2000	1.3000	1.6700	.8000	.7000	.7700
DEPTH	10.0	20.0	1.0	10.0	25.0	40.0	1.0	10.0	25.0	42.0	1.0	10.0	25.0
PERMANENT STATION NO.	063*	062	062	084*	084*	084*	084*	081	081	081	081	077	077
VALUE	.9700	1.4000	1.4000	1.1000	1.1000	1.0000	1.0000	.9200	.9100	.9400	1.0200	.4000	.4000
DEPTH	83.0	1.0	9.5	1.0	10.0	25.0	36.0	1.0	10.0	25.0	34.0	1.0	10.0
PERMANENT STATION NO.	077	077	075	075	075	074*	074*	074*	074*	089	089	089	089
VALUE	.4000	.4000	.3000	.2000	.3000	1.2000	1.1000	1.1000	1.1000	1.3000	1.3000	1.2000	1.7000
DEPTH	25.0	28.0	1.0	10.0	25.0	1.0	10.0	25.0	67.0	1.0	10.0	25.0	82.0
PERMANENT STATION NO.	088	083	088	088	072	072	072	072	078*	078*	078*	078*	069*
VALUE	1.2500	1.2000	1.2500	1.8000	1.2000	1.2000	1.2000	1.5000	1.1000	1.1000	2.7000	2.7000	.8000
DEPTH	1.0	10.0	25.0	74.0	1.0	10.0	25.0	107.0	1.0	94.0	160.0	167.0	1.0
PERMANENT STATION NO.	069*	069*	069*	068*	068*	068*	068*	067	067	067	067	095	095
VALUE	.7500	2.7000	2.7000	1.0000	.9700	2.7200	2.8300	1.3000	1.2000	1.2600	1.6700	1.5200	1.5200
DEPTH	84.0	154.0	173.0	1.0	104.0	154.0	194.0	1.0	10.0	25.0	78.0	1.0	10.0
PERMANENT STATION NO.	095	095	065*	065*	065*	065*	064*	064*	064*	064*	060*	060*	060*
VALUE	1.5300	1.6000	1.1900	1.2500	2.0000	2.4000	.9000	1.0000	2.6000	2.9000	1.0000	1.0000	2.5500
DEPTH	25.0	41.0	1.0	97.0	112.0	151.0	1.0	114.0	150.0	210.0	1.0	84.0	195.0

PERMANENT STATION NO.	094	094	094	094	059*	059*	059*	059*	055*	055*	055*	055*	058
VALUE	1.5000	1.5000	1.5000	1.6000	1.1000	1.1000	2.0000	2.9000	1.1000	1.1000	2.0000	2.0000	1.3000
DEPTH	1.0	10.0	25.0	49.0	1.0	103.0	130.0	177.0	1.0	90.0	140.0	193.0	1.0
PERMANENT STATION NO.	058	058	058	056*	056*	056*	056*	054*	054*	054*	054*	053	053
VALUE	1.3000	1.3000	1.3000	1.2500	1.2500	1.2500	1.2500	1.2000	1.2000	3.0000	3.0000	1.0000	1.0000
DEPTH	10.0	25.0	89.0	1.0	10.0	25.0	90.0	1.0	97.0	121.0	146.0	1.0	10.0
PERMANENT STATION NO.	053	052*	052*	052*	038	038	038	039*	039*	039*	039*	040*	040*
VALUE	2.0000	1.2000	1.2500	2.6200	1.9000	1.9000	1.9000	1.3000	1.3000	2.7000	2.7000	1.3000	1.3200
DEPTH	24.0	1.0	87.0	118.0	1.0	10.0	17.0	1.0	96.0	128.0	148.0	1.0	100.0
PERMANENT STATION NO.	040*	040*	036*	036*	036*	036*	037	037	037	035	035	035	034*
VALUE	3.0300	3.0700	1.3000	1.3000	2.0000	2.0000	1.0500	1.0000	1.0000	1.2500	1.2200	1.2200	1.5200
DEPTH	140.0	170.0	1.0	99.0	142.0	158.0	1.0	10.0	21.0	1.0	10.0	24.5	1.0
PERMANENT STATION NO.	034*	034*	034*	033	033	033							
VALUE	1.5300	2.0000	2.0000	1.3500	1.3500	2.6000							
DEPTH	90.0	105.0	132.0	1.0	93.0	138.0							

CRUISE 7822003 ZONE NUMBER 25

PARAMETER T EB(104)

DEPTH	AREA WEIGHTED MEAN VALUE	AREA	LAYER QUANTITY	INTEGRATED QUANTITY	LAYER VOLUME	INTEGRATED VOLUME	VOLUME WEIGHTED VALUES LAYER	VOLUME WEIGHTED VALUES COLUMN
0.00	1.3467	4621		0.		0.	1.3467	
1.00	1.3467	4621	.622E+04	.6223E+04	.462E+04	.4621E+04	1.3466	1.3467
5.00	1.3465	4495	.246E+05	.3077E+05	.182E+05	.2285E+05	1.3416	1.3466
10.00	1.3367	4376	.298E+05	.6053E+05	.222E+05	.4503E+05	1.3185	1.3441
20.00	1.2998	4816	.553E+05	.1159E+06	.420E+05	.8699E+05	1.3245	1.3318
40.00	1.3506	3374	.979E+05	.2137E+06	.739E+05	.1609E+06	1.3606	1.3284
90.00	1.3720	2260	.192E+06	.4054E+06	.141E+06	.3017E+06	1.0886	1.3435
140.00	2.5322	1142	.161E+06	.5660E+06	.851E+05	.3868E+06	2.5972	1.4633
150.00	2.6664	958	.272E+05	.5932E+06	.105E+06	.3973E+06	2.7522	1.4932
175.00	2.8639	415	.478E+05	.6401E+06	.171E+05	.4143E+06	2.8415	1.5450
200.00	2.8100	136	.196E+05	.6597E+06	.689E+04	.4212E+06	2.8322	1.5662
210.00	2.8600	68	.289E+04	.6626E+06	.182E+04	.4222E+06	I	1.5693
210.00	2.8600	68	0.	.6626E+06	0.	.4222E+06		1.5693
225.00		9						

THE ZONES NOT INCLUDED ARE 0.

1978 LAKE ONTARIO PARAMETER: T EB (104)
DEPTH: 1.0

CRUISE	7822003	
CRUISE DATES	78/04/10. TO 78/04/14.	
1		.6727
2		1.2438
3		1.4873
4		1.9583
5		1.8253
6		1.7494
7		1.9470
9		1.8230
10		1.4686
11		1.6869
12		1.6041
13		1.4533
14		1.5384
15		1.0876
16		.3000
17		1.2359
25		1.3467
17	20.M	1.2190
	40.M	1.2549
	BOTTOM	2.8600
25	20.M	1.2998
	40.M	1.3506
	BOTTOM	2.8600